

1898.

ANNUAL REPORT

OF THE

Medical Officer of Health

FOR THE

BOROUGH OF CREWE,

BY

MEREDITH YOUNG,

M.D., MAST. SURG., D.P.H., &c.

Fellow of the Incorporated Society of Medical Officers of Health ;

Member of the Sanitary Institute ;

Hon. Member Sanitary Inspectors' Association, &c., &c.

Medical Officer of Health to the Borough ;

and Medical Superintendent Borough Hospitals.

CREWE :

WILMOT EARDLEY, PRINTER, CHESTER BRIDGE.

1899.

BOROUGH OF CREWE.

HEALTH COMMITTEE.

1897-8.

Chairman—

COUNCILLOR HENRY TAYLOR.

Members—

HIS WORSHIP THE MAYOR (COUNCILLOR C. H. PEDLEY, C.C.)

ALDERMAN T. LATHAM.

ALDERMAN R. PEDLEY and

„ W. McNEILL.

„ G. WALLIS.

COUNCILLOR G. BAILEY.

COUNCILLOR J. H. MOORE.

„ DR. BAILEY.

„ J. ROBERTSON.

„ J. CLARE.

„ T. SMITH.

„ R. L. DWELLEY.

„ P. SWINTON.

„ J. HALLARD.

„ E. WILSON.

„ J. HARFORD.

and

„ T. H. HEATH.

„ DR WILSON.

„ J. JONES.

Inspector—

WILLIAM URQUHART.

BOROUGH OF CREWE.

Statistical Memoranda.

	Area.	Estimated Population, 1898.
Central Ward	134 acres,	10,680
West Ward	676 „	9,520
North Ward	942 „	10,105
South Ward	441 „	10,605
	<hr/> 2,193	<hr/> 40,910

Height above Sea-level.

Sewage Farm	125 feet.
The Valley	145 „
Market Hall	179 „
Isolation Hospital	182 „
Nantwich Road	189 „
Hightown	200 „
Population at Census, 1891	32,783
Estimated Population at Midsummer, 1898	40,910
Area in Aeres	2,193
Birth-rate per 1,000 living	33.3
Death-rate „ „	17.0
Death-rate from Zymotic diseases	2.5
Deaths under 1 year to 1,000 deaths	169
Deaths under 5 years per cent. of total deaths	47.4
Number of persons to the aere	18
Estimated increase of population since Mid-year, 1897	1,185 persons
Plans of new dwelling-houses passed in 1898	308
Rateable value of Borough (Houses, &c.), 1898	£128,859 0 0
Do. do. (Land), „	£2,389 0 0
Total	<hr/> £131,248 0 0

Charter of Incorporation granted April 27th, 1877.

Commission of the Peace granted April 7th, 1881.

INTRODUCTION.

HEALTH DEPARTMENT,

MUNICIPAL OFFICES,

APRIL, 1899.

*To the Chairman and Members of the Health Committee of the
Creve Town Council.*

GENTLEMEN,

I have the honour and pleasure of presenting you with my Annual Report on the work of the Health Department during the year 1898.

I regret that the Report has been slightly delayed in appearance, a result due in part to the increased work which comes in from all sides, but also in some degree to illness in my own family. Your Committee will, I know, understand that—despite the best efforts—such circumstances do, sometimes unconsciously, retard one's public work.

In the matter of vital statistics I am able to congratulate your Committee on an increased marriage-rate, a fairly maintained birth-rate, and a distinctly reduced zymotic death-rate.

The general death-rate, on the other hand, and that of infants under one year of age shew a slight increase.

Perhaps the most noticeable feature, however, is the lessened prevalence of infectious disease, and in particular of Scarlet Fever. During the whole history of the Borough I do not think so good a record can be found. The one thing which principally accounts for this happy state of affairs is the Isolation Hospital, and it has now abundantly justified its existence.

A large number of important matters have come before your Committee during the year and dealt with not only in a broad-minded and generous spirit but also in a manner which shews that you fully realise the very responsible nature of the duties entrusted to you.

Probably the one thing in particular which will strike your Committee in perusing this Report is the large amount of work which is regularly carried through by the Department as a matter of routine,

and without any reference to you as a Committee. The general principles upon which such work is done has, of course, been laid down at some time either by Statute, or regulation, or by resolution of your Council. I mention the fact for the reason that there is often a tendency to judge of the work done and the strain thrown upon a department by the work which comes before a Committee, and in order that, bearing this in mind, you may the better form an idea of that which has actually been accomplished.

I have to thank your Committee for the kind and encouraging way in which, as a body, you have invariably received any suggestions of mine and for the very thorough and unbiassed consideration you have given them.

The extra clerical assistance your Committee granted me has proved a distinct boon in enabling me to devote a greater amount of time and attention to the work of inspection and organisation. This is shewn by the fact that I was enabled to make 1,743 visits of inspection in 1898, as compared with 1,055 in 1897.

I must record my sincere thanks for cheerfully accorded help in many and various things to all my brother-officials, to everyone of whom I owe many debts of gratitude.

I cannot I am afraid fitly express the high appreciation in which I have always held your Sanitary Inspector (Mr. Urquhart). His record of work is a splendid one, and could it be more fully realised by your Committee I know, and I cannot help saying it, that you would at once attempt to make his remuneration more adequate. I have been on many occasions indebted to him for suggestions born of a long experience of the locality which have not only smoothed the working of the Department, but have also resulted in a saving of expense.

I am, Mr. Chairman and Gentlemen,

Yours faithfully,

Meredith Jones

Annual Report of Medical Officer of Health, FOR 1898.

Population.

The statistics contained in this Report are based upon a population estimated to the middle of the year of **40,910**. In the absence of Census figures for 1881, this has been calculated as follows:—

Houses on Rate Books, March 25th, 1898	...	8,412
Empty houses, Midsummer, 1898	...	230
Total occupied houses	...	8,182
Persons per house (Census 1891)	...	5
Population, 1898	...	40,910

The rate of growth of the town, and the population of children at school age, as well as a number of other factors appear to indicate that this estimate is, if anything, a low one.

New Houses.

Plans passed 1891	...	139
" " 1892	...	169
" " 1893	...	157
" " 1894	...	238
" " 1895	...	283
" " 1896	...	317
" " 1897	...	441
" " 1898	...	308

Habitation certificates granted: —

1897 (11 months)	...	234
1898	...	327

Estimated Population of Wards.

	1897.	1898.
Central	10,395	10,680
West	9,280	9,520
North	9,790	10,105
South	10,260	10,605
	39,725	40,910

Empty Houses.

The Assistant Overseer (Mr. A. Maywhort) has again been good enough to supply the following list of houses empty at Midsummer, 1898:—

TABLE 1.

RATEABLE VALUE.	Under £5.	Above £5, under £10.	Above £10, under £20.	Above £20, under £30.	Above £30, under £40.	TOTAL.
Central Ward ...	2	31	4	1	...	38
West Ward ...	2	22	4	...	...	28
North Ward ...	5	54	14	1	...	74
South Ward...	2	13	73	1	1	90
Borough of Crewe ...	11	120	95	3	1	230
Empty houses, per cent. of houses on Rate Books at each group.	7.1	1.9	5.7	1.2	1.0	2.7

It will be noted that the largest number of empty houses is in the group of lowest rateable value.

It is a most interesting fact, and one which will serve as an antidote to statements which one hears constantly, that in spite of the large number of houses being built annually, the percentage of empty houses has scarcely varied at all during the past four or five years.

The figures themselves are given as far back as they are obtainable.

1894	...	2.0	1896	...	2.8
1895	...	2.4	1897	...	2.6
		1898	...		2.7

Number of Houses on the Rate Book.

						Year ended Mar. 25, 1898.
Houses rated under ...	...	£5	per annum	...	...	154
" " at £5 and under £10			"	...	...	6177
" " £10	"	£20	"	...	...	1640
" " £20	"	£30	"	...	...	233
" " £30	"	£40	"	...	...	98
" " £40	"	£50	"	...	...	48
" " £50	"	£60	"	...	...	17
" " £60	"	£70	"	...	...	15
" " £70	"	£80	"	...	...	10
" " £80	"	£90	"	...	...	4
" " £90	"	£100	"	...	...	5
" " £100	"	£200	"	...	...	10
" " above £200				...	...	1
						<hr/> 8412 <hr/>

The rateable value of the Borough in 1898 was £128,859, an increase of £3,022 on that of 1897.

Marriages.

My thanks are due to the various clergy in the town and the Registrar of Marriages for the following information:—There have been 272 marriages solemnized in the Borough during the year. The number of persons married per thousand living, or the marriage-rate, is therefore 13.29. This is an increase on the rate for 1897, which was 12.28, the total number of marriages for that year being 244.

Births.

The number of births registered during the year was 1,365, viz., 711 of males, and 654 of females, equal to a birth-rate per thousand per annum of 33.3; of these 1,365 births 47 were illegitimate, the percentage of illegitimacy being 3.4. Compared with the average of the previous 10 years, the birth-rate is found to be 0.18 per thousand lower. The birth-rate for England and Wales during 1898 was 29.4 compared with which that of Crewe is a very good one. The birth-rate in the 33 large towns of England and Wales during 1898 was 30.3,

	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
1st Quarter ...	263	236	240	261	273	288	290	303	271	329	342
2nd „ ...	237	239	230	256	262	342	300	320	314	352	347
3rd „ ...	233	232	245	255	281	305	313	317	295	293	341
4th „ ...	221	223	207	222	226	293	312	297	320	304	335
Whole year ...	954	930	922	997	1045	1228	1215	1237	1200	1278	1365
Birth-rate for whole year. }	31.6	33.1	32.4	33.8	35.6	34.7	33.7	33.4	31.4	32.17	33.3

Deaths.

During the year there have been registered 683 deaths, namely, 363 males, and 320 females. Calculated on these figures the death-rate for the Borough would be 16.6 per thousand. A correction is necessary, however, for the deaths of residents of the Borough, which took place in districts and Institutions outside the Borough. There were also nine deaths within the Borough of non-residents—8 of males and one female. Making the necessary correction for the above two things the number of deaths within the Borough becomes 699, namely, 371 of males and 328 of females, and the *corrected death-rate* per thousand of the population is 17.0. This correction has been carried out throughout the whole of the Report, except where otherwise stated. The average death-rate in Crewe for the 10 years 1888-1897 was 16.10. During 1898 it was 0.90 per thousand above this average. The death-rates of England and Wales were as follows:—

General death-rate throughout the whole country ...	17.6
33 large towns	19.0

Illegitimate Deaths.

Of the 699 deaths 13 were in illegitimate off-spring, 12 being in children under one year of age, and one in a child aged three years. The deaths of illegitimate children were therefore responsible for 1.92 per cent. of the total death-rate.

PARTICULARS OF ILLEGITIMATE DEATHS.

3 months	...	F.	...	Marasmus: Exhaustion.
3 years	...	F.	...	Obstruction of Bowels: Peritonitis.
6 months	...	M.	...	Marasmus: Debility.
23 days	...	M.	...	Premature birth.
25 days	...	F.	...	Premature birth.
6 months	...	M.	...	Infantile Convulsions.
6 days	...	F.	...	Convulsions.
4 months	...	F.	...	Tabes Mesenterica.
12 days	...	F.	...	Infantile Diarrhœa: Exhaustion.
2 months	...	M.	...	Starvation (verdict of manslaughter re- [turned by Coroner's Jury).
4 months	...	F.	...	Tabes Mesenterica: Convulsions.
20 days	...	F.	...	Gastro Intestinal Catarrh: Convulsions
5 hours	...	M.	...	Congenital Debility.

The age at death as well as the cause of death in these cases is most significant, indicating the smallness of the chance of living that pertains amongst children not born in wedlock.

Still-born Children.

The number of still-born children brought to the Cemetery for interment during 1898 was 56, or 4.1 per cent. of the total births. The figures for the previous eight years are given below.

				Per cent. of Total Births.					Per cent. of Total Births.
1890	...	36	...	3.9	1894	...	37	...	3.0
1891	...	30	...	3.0	1895	...	71	...	5.8
1892	...	51	...	4.8	1896	...	65	...	5.4
1893	...	48	...	3.9	1897	...	56	...	4.2

The estimate of the eminent statistician, William Farr, that still-births formed on an average four per cent. of the total births is in the main borne out by the above figures.

TABLE 4.—Monthly Death-rate from all causes.

	1894.	1895.	1896.	1897.	1898
January	... 21.9	... 16.1	... 15.0	... 15.4	... 12.6
February	... 15.0	... 19.3	... 14.4	... 21.4	... 21.3
March	... 14.6	... 18.7	... 13.2	... 14.8	... 22.9
April ...	... 12.0	... 16.7	... 12.0	... 17.2	... 22.9
May ...	... 12.0	... 13.1	... 15.3	... 12.38	... 10.8
June ...	... 14.3	... 7.8	... 11.3	... 11.8	... 13.2
July ...	... 15.6	... 14.4	... 13.1	... 11.1	... 12.6
August	... 12.6	... 20.0	... 12.0	... 24.1	... 19.0
September	... 12.0	... 18.8	... 7.8	... 16.4	... 23.1
October	... 10.6	... 17.1	... 16.0	... 13.9	... 15.8
November	... 16.0	... 17.5	... 20.7	... 16.4	... 13.1
December	... 16.6	... 16.5	... 25.1	... 13.7	... 14.0

TABLE 5.—Comparing the actual number of deaths, and the death-rate with those of previous years :—

	1886	1887	1888	1889	1890	1891	1892	1893	1894	1895	1896	1897	1898
1st Quarter	113	110	133	151	138	111	171	171	154	171	137	182	196
2nd „	85	102	85	114	77	127	143	193	115	115	125	141	161
3rd „	136	122	94	92	97	81	107	158	121	164	107	166	190
4th „	107	137	112	106	131	124	106	172	130	158	199	138	149
Whole year	441	471	424	463	443	443	527	694	520	608	568	627	699
Death- rate for Whole yr. }	16·4	17·3	15·3	16·5	15·4	15·0	17·9	19·6	14·4	16·4	14·8	15·77	17·0

TABLE 6.—Apportioning the Deaths during 1898 to the Wards, giving the Death-rate and number of persons per acre. (Deaths of 25 residents dying outside district are not included in this Table).

Ward ... Persons per acre ...	Central.		West.		North.		South.	
	79		14		11		24	
	Number of Deaths.	Death- rate.	Number of Deaths.	Death- rate.	Number of Deaths.	Death- rate.	Number of Deaths.	Death- rate.
1st Qr. ...	51	19·1	36	15·1	36	14·2	63	23·7
2nd „ ...	48	17·9	39	16·3	33	13·0	35	13·2
3rd „ ...	45	16·8	42	17·6	56	22·1	43	16·2
4th „ ...	41	15·3	38	15·9	38	15·0	30	11·3
Whole year	185	17·2	155	16·2	163	16·0	171	16·1

TABLE 7.—Apportioning the Deaths during 1898 to the various age periods.

			Under 1 yr.	1 to 5	5 to 15	15 to 25	25 to 65	65 upwards	Total.
Central Ward	...	...	54	29	3	7	56	36	185
West Ward...	...	...	49	26	5	13	34	28	155
North Ward	...	...	61	20	9	10	38	25	163
South Ward	...	...	68	25	3	10	45	20	171
Borough of Crewe, 1898			232	100	20	40	173	109	*674
„	„	1897	189	95	19	19	182	123	627
„	„	1896	166	90	26	32	151	103	568
„	„	1895	198	90	31	30	169	90	608
„	„	1894	174	72	22	24	154	74	520
„	„	1893	211	139	38	19	181	106	694

* In addition to the above, 25 deaths have occurred in persons temporarily resident outside the Borough whose former address cannot be obtained.

Infant Mortality.

Number of deaths	...	...	...	...	232
Deaths per 1,000 births	...	...	...	...	169

The mortality of children under one year of age has been at the high rate of 169 per thousand registered births and is, in my opinion, one of the worst features in the vital statistics of the town. It is almost the highest on record, and in plain English it means that about one-sixth of the children born have died during the first year of their

life. The rates for the previous twelve years are given herewith and shew at a glance the serious leakage of child-life which is going on.

1886	...	118	1892	...	154
1887	...	146	1893	...	171
1888	...	113	1894	...	143
1889	...	137	1895	...	160
1890	...	142	1896	...	138
1891	...	130	1897	...	146

The infantile death-rate in England and Wales generally in 1898 was 161 per thousand births, and in the 33 large towns it was 178. But in questions of this sort comparisons are to be deprecated. It is not much advantage to know whether we are better or worse than our neighbours, or than the country generally. The question to be decided is—can our existing state be improved, and if so how?

In order of merit, or rather demerit, the following have been the causes of our mortality under this heading the figures indicating the contribution of the particular cause to the total of 169 deaths per 1,000 births. (1) Debility, Atrophy, and Inanition (a cause to which ignorance or carelessness in feeding, clothing, and general management largely subscribes)—39. (2) Lung Diseases (in this particular year largely the consequence of a preceding attack of Measles or Whooping Cough)—27. (3) Diarrhœa—a disease to which the remarks under the first heading apply with equal if not greater force—24. (4) Premature Birth—16. (5) Tabes Mesenterica—a disease of the glands of the bowels which, in some cases at least, is undoubtedly of tubercular origin—10. (6) Convulsions—the accompaniment in many cases of teething or improper feeding, resulting in alimentary disease—6.

The cause which runs through almost all of the above groups is improper feeding and general management during infancy, and this we are endeavouring to combat by the distribution of cards giving simply-worded instructions. I am happy to say these are being widely circulated, and are distinctly appreciated.

The results of this diffusion of knowledge will probably only make themselves gradually felt, but I am convinced that education of the public is the proper line to work upon in this matter.

TABLE 8.—Rates of Mortality of Children under one year of age, from the principal infantile diseases per 1,000 births.

	1894.		1895.		1896.		1897.		1898.	
	Total Deaths	Rate per 1,000 births	Total Deaths	Rate per 1,000 births	Total Deaths	Rate per 1,000 births	Total Deaths	Rate per 1,000 births	Total Deaths	Rate per 1,000 births
From all causes ...	174	...	198	...	166	...	186	...	232	...
ditto ...	...	143	...	160	...	138	...	146	...	169
Diarrhœa ...	6	...	42	...	19	...	45	...	34	...
ditto ...	...	4	...	33	...	16	...	35	...	24
Lung diseases ...	46	...	41	...	63	...	46	...	37	...
ditto ...	...	37	...	33	...	52	...	35	...	27
Convulsions ...	16	...	19	...	11	...	15	...	10	...
ditto ...	...	13	...	15	...	9	...	11	...	7
Premature Birth ...	23	...	21	...	18	...	20	...	22	...
ditto ...	...	18	...	17	...	15	...	15	...	16
Tabes Mesenterica..	15	...	10	...	4	...	8	...	15	...
ditto ...	...	12	...	8	...	3	...	6	...	10
Measles ...	...	...	4	...	2	...	1	...	8	...
ditto ...	...	...	...	3	...	2	...	0·8	...	5
Whooping Cough...	8	...	2	...	1	...	16	...	3	...
ditto ...	...	6	...	1	...	1	...	12	...	2
Tubercular disease.	3	...	2	...	1	...	...	...	3	...
ditto ...	...	2	...	1	...	1	...	...	...	2
Debility ...	24	...	21	...	14	...	12	...	54	...
ditto ...	...	19	...	17	...	12	...	9	...	39

Vaccination.

I am obliged to Mr. T. W. Lovatt, Registrar of Births and Deaths for the following information, which he has been at considerable trouble to work out. The returns refer to the period January 1st to December 31st, 1898.

Births registered	1365
Successfully vaccinated	913
Certificate of Insusceptibility to Vaccination	1
Certificates of Exemption (Conscience Clause)	35
Had Small-pox	none
Died Unvaccinated	159
Postponed by Medical Certificate	75
Removed to other districts	52
In abeyance	130

From the public health point of view these figures reveal a state of affairs which is most gratifying. Taking the gross figures as given above, we have 913 children successfully vaccinated out of a total of 1365 births, or a percentage of nearly 67. But if we exclude 257 cases which are postponed, have removed, or are in abeyance, we have 913 successful vaccinations out of a total of 1108, or a percentage of about 82.5 of successes.

This is a record which will stand very favourable comparison with any town in England and Wales.

Seven Principal Zymotic Diseases.

Number of deaths 105

As usual, epidemic Diarrhœa has been the largest factor in the Zymotic death-rate, Measles coming next. It is significant that Measles and Whooping Cough together, which are usually looked upon as trifling ailments, have caused *three times as great a mortality as that resulting from the whole of the so-called dangerous infectious diseases put together.*

	Rate per 1,000
Diarrhœa	1.14
Whooping Cough	0.21
Diphtheria and Membranous Croup	0.07
Scarlet Fever	0.07
Typhus Fever	0.02
Typhoid Fever	0.17
Measles	0.85
Total	2.53

The Zymotic death-rate in England and Wales generally during 1898 was 2.22, compared with which our own is somewhat unfavourable. In the 33 large towns of England and Wales this rate was 2.85.

TABLE 9.—Number of cases of Zymotic Disease which have come to the knowledge of the Medical Officer of Health during 1898 :—

	Central Ward.	West Ward.	North Ward.	South Ward.	Borough of Crewe.
Measles	73	251	121	288	733
Scarlet Fever	12	10	11	24	57
Diphtheria	7	8	13	8	36
Whooping Cough	9	15	6	16	46
Typhoid Fever	4	9	6	13	32
Total	105	293	157	349	904

TABLE 10.—Number of Deaths from the seven principal Zymotic Diseases during 1898, in the Borough of Crewe.

	Under 5 years.	Over 5 years.	Total.
Measles	34	1	35
Scarlet Fever	1	2	3
Diphtheria and Membranous Croup.	2	1	3
Whooping Cough	9	...	9
Diarrhœa	43	4	47
Typhus and Typhoid Fevers ... ..	...	8	8
Total	89	16	105

TABLE 11.—Number of Deaths from the seven principal Zymotic Diseases in the various Wards during 1898.

	Central	West.	North.	South.
Measles	8	11	3	13
Scarlet Fever ... ..	...	1	2	...
Diphtheria and Membranous Croup.	2	1	...	...
Whooping Cough	4	2	3	...
Diarrhoea	13	3	20	11
Typhus and Typhoid Fevers ...	2	2	1*	3
Total	29	20	29	27
Death-rate per 1,000 per annum ...	2.7	2.2	2.86	2.5

* This death from Typhus Fever occurred in the Isolation Hospital.

TABLE No. 12.

Fatality of Notifiable Zymotic Diseases.

DISEASE.	Cases Notified.	Deaths Reported in these cases.	Case Fatality per cent.
Erysipelas	49	3	6.1
Scarlet Fever	57	3	5.2
Diphtheria and Membranous Croup.	40	3	7.5
Typhus Fever	1	1	...
Typhoid Fever...	32	7	21.87
Puerperal Fever	4	2	50.0

Small-pox.

One case.—No deaths.

The one case of Small-pox which came to break our record of freedom from the disease for many years was contracted, in my opinion, by the patient whilst travelling in the holiday season. There were several cases of the disease notified at that time in districts round about, and in addition to this, as I have pointed out before, Crewe is connected directly with a large number of seaports, and is thus more than ordinarily liable to the accidental introduction of infection. The case was promptly notified and isolated immediately on the appearance of the papular rash, and removed to the Hospital, in Pym's Lane. All who had been in close contact with the patient during the infectious period were sought out and at once vaccinated, or re-vaccinated by the Medical Attendant or myself; those of the Sanitary Staff who were previously unprotected in this way, and had to come in contact with infection were also vaccinated. The Medical Men of the town were notified of the occurrence of the case, in order that they might be on the *qui vive*, and the infected family and all who had been in contact were kept under observation for 18 days.

The precautions adopted proved sufficient to prevent any extension of the disease.

Measles.

Number of deaths ... 35.

A reference is made in a subsequent paragraph to this disease which was epidemic in the latter part of 1897 and the early part of 1898. A most noticeable fact, and one alluded to previously, is that this one disease, which parents usually think so trivial, was the cause of *nearly twice as many deaths as those which occurred from the eight notifiable dangerous infectious diseases taken together*. I mention this again for the sake of the emphasis it deserves.

TABLE 13.—Death-rate per 1,000 per annum from Measles during the year 1898 :—

	Borough of Crewe.	Central Ward.	South Ward.	North Ward.	South Ward.
1898	0·8	0·7	1·1	0·29	1·2
1897	0·02	...	...	0·02	...
1896	0·2	...	...	...	...
1895	0·2	...	...	...	...
1894	...	...	...	...	...
1893	1·0	...	...	...	...
1992	0·2	...	...	...	...

TABLE 13A.—Localities in which fatal cases of Measles occurred during 1898.

Central Ward.	West Ward.	North Ward.	South Ward.
Liverpool Street Bowling Green (2) Meredith Street Oakley Street Dorfold Street Beech Street Heath's Cottages	Ramsbottom St. Hulme Street Peel Street (2) Holt Street Lewis Street Naylor Street (2) Bright Street Peter Street Derby Street	Woodland Terrace William Street Earle Street	Alton Street (3) Gresty Road Railway Street Arthur Street Frederick Street Walthall Street Frances Street Mill Street (3) Cotterill Street
8	11	8	13

TABLE 14.—Actual number of deaths from Measles occurring in the Borough of Crewe during each year since 1874:—

1874 ... 21 deaths	1882 ... 1 deaths	1890 ... 14 deaths
1875 ... 11 „	1883 ... 18 „	1891 ... 1 „
1876 ... 2 „	1884 ... 1 „	1892 ... 5 „
1877 ... 0 „	1885 ... 31 „	1893 ... 34 „
†1878 ... 30 „	1886 ... 0 „	1894 ... 0 „
1879 ... 1 „	1887 ... 32 „	1895 ... 7 „
*1880 ... „	1888 ... 7 „	1896 ... 9 „
1881 ... 9 „	1889 ... 8 „	‡1897 ... 1 „
		1898 ... 35 „

* No record.

† The second half of the year only.

‡ One also occurred in a non-resident.

Scarlet Fever.

Cases notified	...	...	...	57
Number of deaths	...	...	...	3
Case mortality per cent.	...	...	...	5.26
Cases removed to Isolation Hospital	...	...	...	37

This disease has been more or less prevalent the whole year through and the whole town through. The South Ward has suffered a little more than other parts from its visitation. In a number of cases it was clearly introduced into the Borough from places just outside, which have no means of isolating their infectious sick.

On one occasion we had a narrow escape of a wide-spread epidemic. A boy engaged in tending and milking cows on a farm just outside the Borough limits contracted Scarlet Fever and, in spite of this, was allowed in the early stages of the illness to milk cattle and to sleep with another farm-hand who also milked cattle. This went on for three days, when the case came under the notice of a Medical Man and was promptly notified. The farmer very creditably made arrangements at once for the lad to be removed to our Isolation Hospital, undertaking to pay all his expenses. Dr. Turner, of the Nantwich Rural District, and myself both visited the farm at once, and the necessary precautions were strictly carried out. The time was, however, a most anxious one. In my inquiries concerning this case,

I discovered no less than three persons, who, I was confident, had had the disease in a mild form and had transmitted the infection to the farm-lad mentioned. There was not, however, sufficient evidence upon which to base legal proceedings.

TABLE 15.—Death-rate per 1,000 per annum from Scarlet Fever, locating the fatal cases in 1898. Deaths in the Isolation Hospital are relegated to the Wards in which the persons resided.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0·07	...	0·10	0·19	...
1897 ...	0·19	0·19	0·21	0·10	0·19
1896 ...	0·4	0·3	0·3	0·4	0·7
1895 ...	0·5	...	...	...	...
1894 ...	0·2	...	...	...	...
1893 ...	0·5	...	...	...	...
			Samuel Street	Herbert St. New Street	

TABLE 16.—Actual number of deaths from Scarlet Fever occurring in the Borough of Crewe during each year since 1874:—

1874 ... 9 deaths	1882 ... 7 deaths	1890 ... 0 deaths
1875 ... 43 „	1883 ... 7 „	1891 ... 2 „
1876 ... 4 „	1884 ... 0 „	1892 ... 3 „
1877 ... 22 „	1885 ... 13 „	1893 ... 19 „
1878 ... many „	1886 ... 9 „	1894 ... 8 „
1879 ... 77 „	1887 ... 7 „	1895 ... 22 „
*1880 ... „	1888 ... 8 „	1896 ... 18 „
1881 ... 28 „	1889 ... 16 „	1897 ... 7 „
		1898 ... 3 „

* No record.

Diphtheria and Membranous Croup.

Cases notified	...	...	...	40
Number of deaths...	...	...	...	3
Case mortality per cent.			...	7.5

Thirty-six cases of Diphtheria and four of Membranous Croup have been notified during the year. In 11 cases specimens for bacteriological examination were taken, and in 10 of these a negative result was reported. In four of these 10 negative cases, however—as shewn below—a notification of the disease was subsequently sent in by the attending Practitioner; the clinical symptoms of the disease being regarded as unmistakeable. There appears to be an opinion—which I cannot entirely endorse—that such a course of action is not warranted. There are many accidental circumstances occurring antecedent to and during the collection of throat specimens for bacteriological examination which largely determine whether or not a proper specimen shall be obtained, and whether that specimen when examined shall contain demonstrable Diphtheria Bacilli. These are known to all Medical Men who, in consequence, feel themselves entitled to some degree of latitude in expressing an opinion quite independently of the result of the examination.

In spite of this, however, in the large majority of cases the diagnosis of the Bacteriologist has been accepted by the attending Practitioner, and the Health Department, as well as the patient concerned, has in consequence been saved much trouble and expense. The practical worth of the test to all concerned therefore quite outweighs its trivial cost.

There is of course the converse of the above to consider—namely, if some accidental cause previous to or during the taking of the specimen should prevent the bacteriological demonstration of bacilli and the result should therefore be negative, though the case was really Diphtheritic, would not the bacteriological examination be seriously misleading?

The reply to that is that Medical Practitioners, as a rule, rely more upon clinical symptoms for their diagnosis, and use the bacteriological test more to clinch than to form this diagnosis. Moreover, they have the patient under close observation for several days at least after the Bacteriologist's decision has been announced, and may be

trusted if suspicious symptoms do not abate, either to notify the case as Diphtheria or take a fresh specimen for examination.

As tending to bear out the correctness of the examination, it may be stated that in only two cases reported as shewing no bacilli did death subsequently occur. In one case the death was certified as *Scarlatina Anginosa* and in the other as Diphtheria complicated with Scarlet Fever. Had the cases been *true* Diphtheria one would have anticipated at least 25 per cent. of the cases to have died.

The following is the history of all the cases examined bacteriologically:—

SPECIMEN No. 7—No bacilli found; no growth on serum; not notified; recovery.

No. 8—No bacilli found; subsequently notified; post-diphtheritic paralysis supervened; recovery.

No. 9—No bacilli found; not notified because symptoms cleared up; recovery.

No. 10—No bacilli found; subsequently notified; recovery.

No. 11—No bacilli found, though two examinations made; not notified; recovery.

No. 12—A few bacilli found; subsequently notified; recovery.

No. 14—No bacilli found; case complicated with Scarlet Fever; subsequently died of "Diphtheria—Scarlet Fever." The Diphtheria here was laryngeal and the specimen was only taken from the throat.

No. 15—No bacilli found; case cleared up rapidly; recovery.

No. 16—No bacilli found; not notified as Diphtheria; diphtheritic symptoms disappeared, but case died from *Scarlatina Anginosa*.

No. 17—No bacilli found; throat symptoms cleared up and case notified as Scarlet Fever; recovery.

No. 18—No bacilli found; subsequently notified; recovery. In this case the parents indignantly repudiated any suggestion of the disease being Diphtheria, stating that the patient frequently had enlarged tonsils, and that if their own family Doctor had seen her he would have known what was the matter at once. I give this as it was given to me.

THE LOCALITIES AFFECTED BY DIPHTHERIA have been the following :
in each case a short note is given of the sanitary state of the premises.

No. in Register.	Locality.	House Drainage.	Closet Accommodation.	General surroundings.	Remarks.
70	Sheppard Street ...	Satisfactory ...	W.C. ...	Satisfactory ...	
71	Wistaston Road ...	Unventilated ...	W.C. ...	Back passage bad	
72	Newdigate Street .	Unventilated ...	Pail: 14ft. away ...	House very dirty	
78	Remer Street ...	Unventilated ...	Pail: 39ft. away ...	... ..
88	Bridge Street ...	Unventilated ...	Pail: 36ft. away ...	... ..
92	Walthall Street ...	Ventilating shaft too low ...	Pail: 45ft. away ...	Back passage dirty	
96	Hall o' Shaw Street	1 untrapped opening, no ventilation	Pail: 10ft. away ...	Large pool at back of house receives sewage of this and 2 other houses: large manure-heap close to ...	
98	Station Street ...	Unventilated ..	Tipper : ashpit common to six houses ...	Pigeons kept close to house ...	
99	Maxwell Street ...	Satisfactory ...	W.C. ...	Pigeons kept close to house ...	
101	Davenport Street .	Unventilated ...	Pail and uncovered ashpit. Pail too small ...	House dirty ...	
107	West Street ...	Unventilated : D-trap in cellar	Tipper ...	... ..	Membranous Croup.
113	Barnfields ...	Unventilated ..	Covered mixen : 10 ft. from house ...	Yard dirty ...	
114	Nantwich Road ...	Unventilated : catch-pit on drain 5ft. 3in. deep imperfectly covered, and very full ...	Covered mixen : 12 ft. from house : roof dilapidated .	Yard dirty ...	
115	Remer Street ...	Unventilated ...	W.C., Long Hop-per: inefficiently flushed ...	... ..
116	Wistaston Road ..	Unventilated: two D-traps in yard	Pail: 9ft. from house ...	Yard in bad repair: cellar dirty ...	
117	New Street ...	Unventilated ...	Tipper: broken ...	House dirty ...	
122	Wistaston Road ...	A second case in same house—See No. 116.			
136	Gresty Terrace ...	Cellar drain untrapped, strong current of sewer-gas, no ventilation, D-trap in yard ...	Covered mixen: 12 ft. from house ...	... ..	Membranous Croup.
137	Gresty Terrace ...	This case occurred and was notified as Diphtheria.			
139	Victoria Street ...	Unventilated ...	Tipper of form with tipper inside house: occasional bad smells from it	... ..
142	Edleston Road ...	Unventilated ...	W.C. ...	... ..

No. in Register.	Locality.	House Drainage.	Closet Accommodation.	General Surroundings.	Remarks.
147	Nantwich Road ...	Unventilated ...	Pail: 12ft. from house ...	House dirty and badly ventilated: hens and pigeons kept ...	Membranous Croup.
148	New Street ...	Unventilated ...	Fixed receptacle 10 ft. from house: foul smell, uncovered ashpit ...	Dirty ...	
149	Market Street ...	Unventilated ...	Tipper ...	Cellar never used—dirty ...	
154	Minshull New Rd.	Unventilated: sink waste-pipe broken	Covered mixen 48 ft. from house ...	House rather dirty	
155	West Street (West end) ...	Unventilated ...	Covered mixen 14 feet from house: poor condition ...	... ..
156	(Same house as )	... ..	... ..	... ..
157	(No. 155)	Membranous Croup.
164	Frances Street ...	Unventilated ...	Cesspool privy 20 feet from house: bad condition ...	... ..
172	New Street ...	Unventilated: D-trap by sink-pipe ...	Tipper closet in dirty condition...	Dirty ..	
184	Van on Market Ground	... ..	... ..	... ..
215	Lincoln Street ...	Unventilated: rain-water pipe connected direct ...	Covered mixen 15 feet from house...	... ..
216	Chester Street ...	Unventilated ...	Tipper: rather dirty	Membranous Croup.
223	Ludford Street ...	Unventilated: bell-trap in yard, rain-water pipe connected direct ...	Uncovered mixen 24ft. from house: leaks occasionally, bad condition. Has a drain connected with it which runs into house drain ...	House dirty ...	
229	Buxton Avenue ...	Satisfactory ...	W.C. ...	Back passage dirty	
231	Samuel Street ...	Ditto ...	W.C. ...	... ..
238	Furnival Street ...	Ditto ...	W.C. ...	... ..
239	Lyon Street ...	Unventilated ...	Tipper ...	Back yard filthy: patches of excreta lying all over it	
243	Same house as No. 239	Manure heap, and many collections of bones, rags, &c. in yard
245	Market Street ...	Ventilated by soil-pipe only: sink waste-water runs about 24 ft. right across yard before reaching gully. Bath waste-pipe enters rainwater pipe, this being disconnected.	W.C., no ashpit—ashes, &c., thrown on to yard. Cess-pool privy in yard for workmen, about 60ft. from house; urinal built over receptacle of this and is not flushed ...	... ..

It has been suggested that Diphtheria is a disease which should be isolated, and that in the matter of isolation preference should be given to Diphtheria or Typhoid Fever.

This is not exactly an easy matter to argue. It may be taken as the practically unanimous view of the public health profession that infectious diseases call for isolation much in the following order:—Typhus Fever, Small-pox, Cholera, Scarlet Fever, Typhoid Fever, Diphtheria, Phthisis, and Measles.

The period during which infection is active and dangerous in Diphtheria is, though not short as was at one time thought, still much shorter than in Typhoid Fever; moreover, the infection of the former is more easily capable of destruction. In Typhoid Fever, again, proper nursing treatment is the prime essential; in Diphtheria nursing though a necessity is scarcely required so much.

And, finally, the fact that Enteric Fever is a water-borne disease, whilst Diphtheria has not been shewn to be such leads us to the exercise of a much greater amount of precaution in dealing with its infective agency. As Dr. Christopher Childs stated in his lecture to the Sanitary Institute Congress last year, the nurses hold the first line of defence against the spread of Typhoid Fever.

Let them carefully destroy all infective matter before it leaves their domain and all will be well; but let some careless or ignorant person neglect this and no one knows when or where those escaped bacilli will once more begin their work. This is particularly applicable, of course, in districts where untreated sewage finds its way by leakage, or otherwise, into rivers and streams. There are many places which, though they do not draw water direct from a river, yet do so indirectly, taking their supply from a well which has an unseen connection with the river.

But apart from this I am hopeful that the more extended use of antitoxin, and particularly its use as a prophylactic, will render isolation in Diphtheria, except in a very few cases, unnecessary.

Its use to this end in New York and particularly in Chicago—in many thousands of cases—has given such excellent results that it cannot be long before it is more extensively used in England.

TABLE 18.—Death-rate per 1,000 per annum from Diphtheria and Membranous Croup, locating the fatal cases in 1898.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0·07	0·19	0·10	...	...
1897 ...	0·29	0·3	0·3	0·1	0·2
1896 .	0·2	0·2	0·2	...	0·5
1895 ...	0·05	...	...	...	...
1894 ...	0·05	...	...	...	...
1893 ...	0·5	...	...	...	...
		Market Street Albert Street	West Street		

TABLE 19.—Actual number of deaths from Diphtheria occurring in the Brough of Crewe during each year since 1874 :—

1874 ...	0 deaths	1882 ...	4 deaths	1890 ...	4 deaths
1875 ...	7 „	1883 ...	6 „	1891 ...	3 „
1876 ...	7 „	1884 ...	4 „	1892 ...	9 „
1877 ...	2 „	1885 ...	4 „	1893 ...	19 „
*1878 ...	„	1886 ...	5 „	1894 ...	2 „
1879 ...	2 „	1887 ...	16 „	1895 ...	2 „
*1880 ...	„	1888 ...	14 „	1896 ...	10 „
1881 ...	1 „	1889 ...	8 „	1897 ...	11 „
				1898 ...	3 „

* No record.

Whooping Cough.

Number of deaths ...	...	9
Death-rate per 1,000 of population	...	0·21

The prevalence of this disease was greatest in March and April, and the mortality curve coincided with that of prevalence. The deaths were mostly due to the almost inevitable complications of the disease—Convulsions, Bronchitis, Pneumonia, etc.

TABLE 20.—Death-rate per 1,000 per annum from Whooping Cough, locating the fatal cases in 1898.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0·21	0·37	0·21	0·29	...
1897 ...	0·65	0·19	0·53	1·02	0·87
1896 ...	0·2	0·3	0·1	0·3	...
1895 ...	0·1	0·1	0·4	...	0·1
1894 ...	0·5	...	...	...	...
1893 ...	0·4	...	...	...	...
1892 ...	0·8	Co-operative Street Liverpool St. Charles St. Lawrence St.	Bright St. Adelaide St.	William St. Meredith St. New St.	...

TABLE 21.—Actual number of deaths from Whooping Cough occurring in the Borough of Crewe during each year since 1874:—

1874 ...	1 deaths	1882 ...	9 deaths	1890 ...	0 deaths
1875 ...	9 „	1883 ...	4 „	1891 ...	13 „
1876 ...	2 „	1884 ...	14 „	1892 ...	23 „
1877 ...	9 „	1885 ...	11 „	1893 ...	14 „
*1878 ...	„	1886 ...	8 „	1894 ...	19 „
1879 ...	9 „	1887 ...	4 „	1895 ...	7 „
*1880 ...	„	1888 ...	4 „	1896 ...	8 „
1881 ...	4 „	1889 ...	17 „	1897 ...	26 „
				1898 ...	9 „

* No record.

Diarrhœa.

Number of deaths 47

Mortality per 1,000 of the population ... 1.14

The mortality from this disease shews an improvement on that recorded during the previous year, when it was 1.53. My inquiries into the fatal cases shewed that the same causes were at work as previously—maternal ignorance or neglect coupled with insanitary surroundings, and particularly with soil pollution. The same measures were carried out as in previous years, particular attention being paid to the cleansing and disinfection of privies and ashpits, the flushing of drains, and the cleansing of surfaces around the dwellings.

The condition of back yards and back passages has a most important effect, in my opinion, upon the prevalence of this disease, and it is to be hoped that before long your Council will become persuaded of the benefits of a paved and impervious surface in and around dwellings, particularly in the poorer classes of house, where habits of cleanliness are conspicuous by their absence, and where in consequence a pervious surface becomes quickly and dangerously polluted.

TABLE 22.—Death-rate per 1,000 per annum from Diarrhœa, locating the fatal cases in 1898.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	1.14	1.21	0.31	1.97	1.03
1897 ...	1.53	1.05	2.26	2.45	0.48
1896 ...	0.5	0.6	0.4	0.4	0.5
1895 ...	1.3	1.0	1.3	1.8	0.9
1894 ...	0.3	...	...	...	...
1893 ...	2.5	...	...	...	...
1892 ...	0.8	...	...	...	...

TABLE 22A.—Localities in which fatal cases of Diarrhœa occurred during 1898.

Central Ward.	West Ward.	North Ward.	South Ward.
Manchester Street Beech Street (2) Frank Street Duke Street Victoria Street Meredith Street Whitegates Church Street Forge Street Liverpool Street Liverpool Terrace Wistaston Road	Stafford Street Ramsbottom St. Alban Street	New Street (2) Cemetery Road Farrington Street Audley Street (2) Hall-o'-Shaw St. Earle Street (2) Minshull New Rd. Lime Street Gresty Terrace Henry Street Ridgway Street Sheppard Street Beech Grove Hungerford Road Meredith Street Buxton Avenue Stoneley Road	Nantwich Road (2) Walthall Street (2) Mill Street Francis Street Chambers Street Pedley Street Railway Place Wood Street Clarke Street
13	3	20	11

TABLE 23.—Actual number of deaths occurring from Diarrhœa in the Borough of Crewe during each year since 1874 :—

1874 ... 21 deaths	1882 ... 16 deaths	1890 ... 15 deaths
1875 ... 19 „	1883 ... 10 „	1891 ... 11 „
1876 ... 21 „	1884 ... 32 „	1892 ... 24 „
1877 ... 5 „	1885 ... 6 „	1893 ... 93 „
1878 ... 41 „	1886 ... 39 „	1894 ... 13 „
1879 ... 2 „	1887 ... 14 „	1895 ... 49 „
*1880 ... „	1888 ... 7 „	1896 ... 22 „
1881 ... 0 „	1889 ... 14 „	†1897 ... 61 „
		1898 ... 47 „

* No record.

† One case of Dysentery included.

Typhoid Fever.

Cases notified	...	...	...	32
Number of deaths	...	...	...	7
Case mortality per cent.	...	...	...	21.87

Your Committee decided during the early part of the year to offer facilities to Medical Men in the diagnosis of Typhoid Fever. More recently a strong recommendation has been sent out that all cases of that disease intended for admission to the Isolation Hospital should have the test applied before admission.

Twenty-one cases have thus been examined, and the results were as follows:—

Positive—rapid and complete	...	...	10
Positive—slow and incomplete	...	...	4
Negative	...	...	7

The whole of the positive cases were removed to the Hospital and kept under observation. The 10 cases which had given a rapid and complete re-action passed through a typical attack of the disease; the four which had given a slow and incomplete re-action had all mild attacks. Of the seven negative cases one was admitted to the Hospital and died there, the primary cause of death being, in the opinion of the Medical Attendant, Enteric Fever, and the secondary Pneumonia.

I had many opportunities of seeing this case and could not satisfy myself that it was typical of Enteric Fever. However, I would not by any means on that account set aside the diagnosis of the attending Practitioner. I simply mention it as shewing that there was some sort of legitimate doubt about the nature of the illness.

Of the other negative cases one proved to be Typhlitis combined with Perityphlitis, another Malignant Endocarditis, another Typhus Fever, and another acute Inflammation of the Brain with Pachymeningitis, as ascertained by *post mortem* examination. I am not acquainted with the subsequent history of the two other negative cases.

These results appear to indicate that in the serum test for Enteric Fever, we have a most effective means of diagnosis of what all Medical Men admit to be one of the most puzzling diseases, and at the same time one in which early recognition is of the highest possible importance in preventing its spread.

The following is a short note of the sanitary circumstances found in connection with the houses in which Typhoid Fever appeared.

No. in Register.	Locality.	House Drainage.	Closet Accommodation.	General surroundings.	Remarks.
65	Ludford Street ...	Unventilated	Pail : 15ft. from house ...	... ..
121	Union Street ..	Unventilated: Bell-trap in yard ...	W.C., leaking ...	... ..
131	Coppenhall Terrace	Unventilated ...	W.C. ...	Yard dirty ...	
168	Hungerford Road .	Satisfactory ...	W.C. ...	... ..	Disease contracted at New Brighton
171	Wistaston Road ...	Unventilated ...	Fixed receptacle 12 feet from house—leaking on to field at back, very bad condition ...	House very dirty .	Disease <i>probably</i> contracted at Conway
178	Wistaston Road ...	Blocked in yard ...	W.C., pan broken. ...	... ..	Disease <i>probably</i> contracted in Shropshire
186	Victoria Street ...	Unventilated: rainwater pipes direct to drain ...	W.C., poor flush... ..	... ..	Disease contracted in Scotland
187	Oakley Street ...	Unventilated: rainwater pipes direct to drain ...	Covered mixen 10 feet from house—leaking badly ...	Yard very foul from leaking mixen ...	
189	Farrington Street .	Unventilated ...	Pail: 24ft. from house ...	House rather dirty	
191	West Street (East End)	Ditto ...	Pail: 18ft. from house: some leakage ...	... ..	Disease <i>probably</i> contracted at Deganwy
195	Chambers Street...	Ditto ...	Covered mixen 21 feet from house...	Back yard dirty ..	
196	Chambers Street...	Ditto ...	Covered mixen 15 feet from house...	Ditto ...	
197	Bank Street ...	Ditto ...	Tipper, very dirty.	House and yard very dirty ...	
198	Alexandra Street..	Ditto ...	Covered mixen ...	House dirty ...	
201	Brown Street ...	Ditto ...	Covered mixen 15 feet from house...	Yard dirty ...	
202	Nantwich Road ...	Ditto ...	Covered mixen: deep and offensive	... ..
203	Catherine Street...	Ditto ...	Covered mixen 15 feet from house...	... ..
204	Goddard Street ...	Ditto: sink pipe too short, allowing pollut'n of ground near gully ...	W.C. & uncovered ashpit. Pan of W.C. dirty ...	House & yard dirty	
205	West Street (East End)	Unventilated ...	Covered mixen 11 feet from house: roof dilapidated, and contents wet and offensive ...	House damp, back passage dirty: leakage from privy pails of houses at back	

No. in Register.	Locality.	House Drainage.	Closet Accommodation.	General surroundings.	Remarks.
206	Wood Street ...	Unventilated ...	Covered mixen 12 feet from house...	Yard dirty ...	
210	Newdigate Street .	Ditto: cellar drainage faulty ...	Pail close under bedroom window ...	Defective paving near gully ...	
211	Wood Street ...	Unventilated ...	Pail: 20 feet from house ...	... ..
212	Edleston Road ...	Ventilated by soil-pipe which is too short ...	W.C., dilapidated ashpit ...	Complaint of smells from block of four privies in next yard ...	
217	Wood Street ...	Unventilated ...	Covered mixen 15 feet from house...	Bedroom dirty ...	
218	Francis Street ...	Unventilated: sink pipe too short ...	Pail: 8 feet from house ...	Yard badly paved. and passage dirty	
219	Goddard Street ...	Unventilated ...	Tipper adjoining house ...	Bedroom damp ...	
220	Sheppard Street ...	Ditto ...	Covered mixen 20 feet from house...	Bedroom dirty: yard rather dirty	<i>Probably contracted away from Crewe</i>
228	Arthnr Street ...	Ditto ...	Covered mixen 10 feet from house: dirty condition...	... ..
233	Ramsbottom Street	Ditto ...	Covered mixen about 15ft. from house ...	... ..
237	William Street ...	Ditto: D-trap ...	Pail (old bucket in place of this) 14 feet from house: very dirty condition ...	Yard dirty, and only small portion paved	
240	Mill Street ...	Ditto: D-trap ...	Covered mixen 14 yards from house	... ..
244	Middlewich Street.	Unventilated ...	Pail 13 feet from house ...	... ..

TABLE 24.—Death-rate per 1,000 per annum from Typhoid Fever, locating the fatal cases in 1898. Deaths occurring in the Isolation Hospital are relegated to the Wards in which the persons resided.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0·17	0·09	0·31	...	0·28
1897 ...	0·10	0·3	...	0·3	0·3
1896 ...	0·2	0·2	0·4	0·1	0·1
1895 ...	0·1	0·1	0·1	0·1	0·1
1894 ...	0·1	...	...	...	...
1893 ...	0·2	...	...	...	...
1892 ...	0·1	...	...	...	...
		Farrington Street	Wistaston Road Alexandra Street West Street		Nantwich Road Wood Street Mill Street

TABLE 25.—Actual number of deaths from Typhoid Fever occurring in the Borough of Crewe during each year since 1874:—

1874 ...	4 deaths	1882 ...	10 deaths	1890 ...	11 deaths
1875 ...	15 ..	1883 ...	4 ..	1891 ...	4 ..
1876 ...	8 ..	1884 ...	13 ..	1892 ...	3 ..
1877 ...	12 ..	1885 ...	4 ..	1893 ...	9 ..
*1878 ...	..	1886 ...	7 ..	1894 ...	5 ..
1879 ...	6 ..	1887 ...	11 ..	1895 ...	6 ..
*1880 ...	..	1888 ...	6 ..	1896 ...	9 ..
1881 ...	9 ..	1889 ...	0 ..	1897 ...	4 ..
		* No record.		1898 ...	7 ..

Phthisis.

Number of deaths	...	...	24
Mortality per 1,000 of population	...	...	0·58

Issued by order of the Town Council.

BOROUGH OF CREWE.

PLEASE
KEEP THIS
FOR
FUTURE
REFERENCE

Simple Rules for the Prevention of PHTHISIS or CONSUMPTION.

Consumption is an infectious disease. It is therefore preventible, and in many cases curable.

Consumptive persons not only cause danger to others but also to themselves by the neglect of proper precautions. One of the greatest dangers a consumptive person is exposed to is the infection of other parts of *his own* lungs and of *his own* system by infection given off from *his own* body; a cure is thus frequently prevented.

A consumptive person who follows out the following recommendations is not only doing the best thing possible for others but is at the same time largely increasing his own chance of recovery.

Consumption does not appear to be infectious through the breath, but is most infectious by means of the sputum or spit which the sick person coughs up from his diseased lung.

Consumption of the lungs spread from one person to another mainly by means of the spit or phlegm which is coughed up by the sick person becomes dried and renders the air infective. This infected air when breathed may cause consumption. Therefore the main point in the prevention of the disease is to know

HOW TO DEAL PROPERLY WITH THE SPIT OR PHLEGM.

1. It should be received into a piece of rag or paper and this should be *at once burned*.

2. Consumptive people should not spit into a pocket handkerchief, nor should they swallow their own expectoration. Sputum may be received into a glass or porcelain vessel containing some disinfectant. Two table-spoonfuls of pure carbolic acid well mixed with one pint of water makes a reliable disinfectant. A little sanitas fluid or other similar substance added to this makes it more pleasant smelling. The contents of this vessel should be emptied once a day into the drain *outside*, or burned on the back of the fire, the vessel being then thoroughly washed both inside and outside with boiling water.

3. Consumptive persons when attending any public assembly should use a small hand-glass spittoon containing the aforementioned disinfectant solution. Spittoons which can be carried about without attracting notice may be had from any chemist.

4. No person whether consumptive or not should spit on the floor or walls of any room, railway carriage, omnibus, etc.; the habit is not only disgusting and filthy but also dangerous in many cases.

HOW TO DEAL WITH THE SICK ROOM, &c.

1. The eating utensils used by a consumptive person should be kept for his use alone and apart from those used by other persons; they should be washed apart from others and in boiling water as soon after use as possible.

(OVER,

2. The clothing, bed clothes, etc., of a consumptive person should be washed separately from other persons' clothing; everything should be boiled which can be boiled. Those which would be injured by boiling should be soaked in disinfectant and water for several hours before being washed.

3. The bowel discharges and soiled linen of consumptive persons should be disinfected with fresh chloride of lime solution (two ounces chloride of lime to one gallon of water well mixed).

4. A consumptive person should not kiss or be kissed on the mouth.

5. A consumptive person should if possible occupy a separate room. Where this is not possible *special care* should be taken to destroy all sputum, etc. The furniture of this room should be plain and not such as to be likely to provide lodgment for dust; bed-hangings, unnecessary carpets, rugs, etc., should be avoided.

6. When it is known or suspected that any member of the household is consumptive the whole house should be at once thoroughly cleansed, including the walls and ceilings; the furniture, walls, and floors should be washed with water containing eight table-spoonfuls of carbolic acid to the gallon; the ceiling should be limewashed and arrangements made with the Health Department for the disinfection of any bedding, clothing, etc., which has been exposed to infection. This will be done free of any charge and in a quiet manner if a request be sent to the Medical Officer of Health. The room occupied by the consumptive person should be cleansed in the foregoing manner at least once in every two months.

6. In the event of the death of a consumptive person the Health Department will carry out all necessary disinfection on request free of all charge.

TO AVOID TAKING THE DISEASE.

1. A mother who is suffering from consumption should not suckle her child.

2. All cows milk, *especially that for the use of children*, should be thoroughly boiled before being drunk. Cows suffer from consumption and in such cases the germs of the disease are often contained in milk; boiling the milk destroys these germs, and so prevents the disease.

3. All meat should be thoroughly well cooked and not eaten underdone.

4. Every house, small or large, should be thoroughly ventilated at least once a day and all dark corners should be kept scrupulously clean. Fresh air and sunlight are the best preventives of this and many other infectious diseases.

5. All persons, and especially those who are subject to bronchitis or other lung disease, should beware of living in damp, dark, or overcrowded houses, or of engaging in dusty or sedentary indoor occupations.

6. Cats, poultry, and some other domestic animals are liable to suffer from consumption, which disease they may transmit to human beings; any such animal suffering from a chronic disease should be destroyed.

The above recommendations are based largely upon those issued by the Incorporated Society of Medical Officers of Health and, therefore, represent the opinions of those well qualified to give advice.

The 24 deaths recorded as due to this disease occurred at the following ages :—

Under 20 years	...	...	...	3
Above 20 and under 30 years	...	...	...	8
„ 30	„ 40	„	...	6
„ 40	„ 50	„	...	4
„ 50	„ 60	„	...	2
„ 60 years	...	...	...	1

Though the period for which trustworthy data are available is only a short one, it would appear that the mortality from Pulmonary Consumption is slightly decreasing. Appended to the Report will be found a handbill on the prevention of the disease, which is largely based upon the Memorandum issued by the Incorporated Society of Medical Officers of Health. These handbills have been distributed to every household in the Borough.

In every case of death from Phthisis, or any other form of Tuberculosis, my request to allow the house to be disinfected has met with a ready compliance.

TABLE 26.—Death-rate per 1,000 per annum from Phthisis during 1898. Two deaths in residents dying outside the Borough are not included in the Ward rates as their former address could not be obtained.

	Borough of Crewe.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0·58	0·56	0·63	0·49	0·47
1897 ..	0·73	0·6	0·4	1·0	0·6
1896 ...	0·8	1·0	1·2	0·6	0·6
1895 ...	1·1	1·0	1·4	1·5	0·6
1894 ...	1·0	...	...	...	...
1893 ...	0·9	...	...	...	...
1892 ...	0·8	...	...	...	...

TABLE 27.—Actual number of deaths from Phthisis occurring in the Borough of Crewe during each year since 1874 :—

1874 ... 31 deaths	1882 ... 28 deaths	1890 ... 36 deaths
1875 ... 30 „	1883 ... 45 „	1891 ... 23 „
1876 ... 27 „	1884 ... 25 „	1892 ... 24 „
1877 ... 19 „	1885 ... 33 „	1893 ... 31 „
*1878 ... „	1886 ... 34 „	1894 ... 35 „
1879 ... 28 „	1887 ... 39 „	1895 ... 42 „
*1880 ... „	1888 ... 22 „	1896 ... 33 „
1881 ... 26 „	1889 ... 38 „	1897 ... 29 „
* No recrd.		1898 ... 24 „

Other Forms of Tuberculosis.

The following Deaths have occurred from these diseases :—

	1898	1897
Tubercular Meningitis	13	7
Tubercular Peritonitis	5	2
Tabes Mesenterica	18	12
Tubercular Ulceration of Intestine	3	1
Acute General Tuberculosis	2	1
Total	41	23

The separate causes of death given above are not distinguished in previous Reports, the diseases being grouped differently. The following comparative statement of deaths is interesting, however :—

	1892	1893	1894	1895	1896	1897	1898
Tubercular Meningitis ... ..	...	7	9	6	4	7	13
Tubercular Peritonitis	1	5	...	...	3	2	5
Tabes Mesenterica	23	20	18	19	4	12	18
Other forms of Tuberculosis	4	...	5	6	2	2	5
Total	28	32	30	31	13	23	41

The figures for 1898 shew a departure from the average, and that too in the wrong direction. On the other hand here, as in the country generally, Tuberculosis of the Lungs is apparently decreasing.

Influenza.

Number of deaths 9

Mortality per 1,000 of population 0.21

No epidemic prevalence of this disease falls to be recorded in this Report. The cases which occurred were of a speradic or scattered nature and, so far as I could ascertain, were in old victims of the illness. The deaths mostly resulted from lung complications.

TABLE 28.—Death-rate per 1,000 per annum from Influenza, locating the fatal cases in 1898.

	Borough of Crewc.	Central Ward.	West Ward.	North Ward.	South Ward.
1898 ...	0.21	0.28	0.10	0.09	0.37
1897 ...	0.10	0.09	0.1	0.1	0.09
1896 ...	0.07	0.01	...	0.01	...
1895 ...	0.1	...	...	...	...
1894 ...	0.15	...	...	...	...
1893 ...	0.2	...	...	...	...
1892 ...	0.3	...	...	...	...
		Lawrence St. Cross Street Havelock St.	Ford Lane	Henry Street	Mill St. (2) Bedford St. Camm Street

Pneumonia.

Number of deaths 57

Mortality per 1,000 of population 1.39

Of the 57 deaths registered as due to this disease 16 were in children under one year of age, and 10 in children over one but under

five years of age. During the past seven years the death-rates per 1,000 per annum from Pneumonia have been as under :—

1898	...	1.39	1894	...	1.2
1897	...	1.5	1893	...	2.5
1896	...	1.8	1892	...	1.2
1895	...	1.3			

Deaths in the Cottage Hospital.

Eight deaths have occurred in this Institution of persons resident in the Borough, the causes of death being as follows :—

Ovarian Tumour.	Pneumonia.
Fracture of Skull.	Hemiplegia.
Acute Rheumatism.	Alcoholism.
Shock from Burns.	Suicide.

Deaths in the Accident Hospital.

Five deaths occurred in the L. & N. W. R'ly Co.'s Hospital, three of these being the direct consequence of accidental injuries, one the consequence of Blood Poisoning following an injury, and one being due to Purulent Peritonitis.

Deaths in the Isolation Hospital.

Seven deaths occurred in this Institution of persons resident in the Borough; three of these were from Typhoid Fever with complications, one from Typhus Fever, and one from Laryngeal Diphtheria following on Scarlet Fever.

Inquests.

There were 54 Inquests held during 1898 on residents of the Borough, or, in other words, an inquest was held on the bodies of 77 out of every 1,000 residents who died within the Borough.

The causes of death as recorded are given in the following table.

Altogether there were 57 uncertified deaths of residents, and on all but three of these an official inquiry was instituted to ascertain and place upon record the cause of death.

Causes of Death as ascertained at Coroner's Inquests.

TABLE 29.

Syncope	...	...	...	...	...	...	...	...	...	4
Apoplexy	...	...	...	...	...	...	...	...	...	1
Suicide (cut throat)	...	...	...	...	...	...	...	...	...	4
„ (hanging)	...	...	...	...	...	...	...	...	...	3
„ (drowning)	...	...	...	...	...	...	...	...	...	1
„ (poisoning)	...	...	...	...	...	...	...	...	...	1
Alcoholism	...	...	...	...	...	...	...	...	...	5
Drowning (accidental)	...	...	...	...	...	...	...	...	...	3
Heart Disease	...	...	...	...	...	...	...	...	...	2
Burns and Scalds	...	...	...	...	...	...	...	...	...	4
Bronchitis	...	...	...	...	...	...	...	...	...	2
Concussion of Brain (accidental fall)	...	...	...	...	...	...	...	...	...	1
Convulsions (found dead in bed)	...	...	...	...	...	...	...	...	...	1
Hæmorrhage	...	...	...	...	...	...	...	...	...	1
Injuries (accidental)	...	...	...	...	...	...	...	...	...	14
Overlain	...	...	...	...	...	...	...	...	...	2
Purulent Peritonitis	...	...	...	...	...	...	...	...	...	1
Premature Birth	...	...	...	...	...	...	...	...	...	1
Natural causes	...	...	...	...	...	...	...	...	...	1
Starvation	...	...	...	...	...	...	...	...	...	1
Blood Poisoning	...	...	...	...	...	...	...	...	...	1

In addition to the above, an inquest was held on the body of a non-resident who was found to have died of the rupture of a blood-vessel in the lungs.

TABLE 30.

Vital Statistics of Crewe Borough.

	Birth-rate.	Death-rate per 1,000 per annum.							Per 1,000 born under 1 year.
		All Causes.	Zymotic.	Respi- tatory.	Phthisis.	Diarrhoea	Children. Per cent. of total Deaths under		
							1 year.	5 years.	
1888...	34·6	15·3	1·5	3·7	0·8	0·3	25·9	...	113
1889...	33·1	16·5	2·2	3·0	1·3	0·5	29·6	45·3	137
1890...	32·4	15·4	1·8	3·1	1·2	0·5	29·5	39·5	142
1891...	33·8	15·0	1·2	4·3	0·8	0·4	29·3	39·5	130
1892...	35·6	17·9	2·3	3·2	0·8	0·8	30·7	45·0	154
1893...	34·7	19·6	5·3	4·4	0·9	2·5	30·4	50·7	171
1894...	33·7	14·4	1·3	2·9	1·0	0·3	33·4	47·3	143
1895...	33·4	16·4	2·4	3·2	1·1	1·3	32·5	47·3	160
1896...	31·4	14·8	1·9	4·2	0·8	0·5	29·2	45·0	138
1897...	32·17	15·77	2·81	3·65	0·73	1·53	30·3	45·7	146
Average of above 10 years.	33·48	16·10	2·27	3·56	0·94	0·86	30·0	45·0	143
1898	33·3	17·0	2·5	3·05	0·58	1·14	33·1	47·4	169

TABLE 31.—Showing death-rates from certain diseases and groups of diseases for the five years, 1893 to 1897, and for 1898:—

Name of Disease.	1893	1894	1895	1896	1897	Average for 5 years, 1893-97.	1898
Cancer	0·54	0·52	0·56	0·57	0·40	0·51	0·51
Diarrhœa	2·5	0·3	1·3	0·57	1·53	1·24	1·14
Respiratory Diseases ...	4·4	2·9	3·2	4·2	3·78	3·69	3·05
Measles	1·0	Nil.	0·2	0·2	0·02	0·28	0·85
Erysipelas	0·2	0·05	0·05	0·1	0·23	0·15	0·07
Diphtheria	0·5	0·05	0·05	0·2	0·28	0·21	0·07
Scarlet Fever	0·5	0·2	0·5	0·4	0·18	0·35	0·07
Typhoid Fever	0·2	0·1	0·1	0·2	0·15	0·15	0·17
Whooping Cough	0·4	0·5	0·1	0·2	0·65	0·37	0·21
Old Age	0·8	0·72	0·97	0·86	0·54	0·77	0·65
Influenza	0·2	0·15	0·1	0·07	0·10	0·12	0·21
Premature Birth	0·43	0·63	0·56	0·4	0·92	0·58	0·53
Nervous Diseases... ..	1·82	1·41	1·54	1·2	2·01	1·59	1·27
Digestive Diseases	0·52	0·70	0·75	0·62	0·48	0·61	1·61
Urinary Diseases	0·36	0·08	0·1	0·2	0·10	0·16	0·21
Phthisis,	0·9	1·0	1·1	0·8	0·73	0·90	0·58
Heart Disease	0·79	1·19	1·1	1·36	1·80	1·24	1·24
Other Tubercular Dis- eases (excluding Tabes Mesenterica)	0·39	0·38	0·32	0·23	0·27	0·31	0·56
Tabes Mesenterica	0·69	0·50	0·51	0·10	0·30	0·42	0·43
Ill-defined	0·33	1·05	1·18	0·73	0·60	0·77	1·71
Violence	0·47	0·30	0·54	0·47	0·27	0·41	0·75

TABLE 32.—Shewing gains and losses in the death-rate per 1,000 persons living in the year 1898, as compared with the average rates for the five years 1893—1897.

GAINS.

Name of Disease.	Average Rate during five years 1893—1897	Rate during 1898.	Gains per 1,000.	Probable Number of lives saved.	Lives lost or gained during 1897.
Diarrhœa	1·24	1·14	0·10	4	18 lost
Respiratory Diseases.	3·69	3·05	0·64	26	18 lost
Erysipelas	0·15	0·07	0·08	3	5 lost
Diphtheria	0·21	0·07	0·14	5	2 lost
Scarlet Fever	0·35	0·07	0·28	11	6 saved
Whooping Cough ..	0·37	0·21	0·16	6	11 lost
Old Age	0·77	0·65	0·12	4	13 saved
Premature Birth ...	0·58	0·53	0·05	2	16 lost
Nervous Diseases ...	1·59	1·27	0·32	13	18 lost
Phthisis	0·90	0·58	0·32	13	7 saved
Other Diseases ... ..	...	...	0·17	6	70 saved
Gross Gains ... ..	...	...	2·38	93	

TABLE 32.—Shewing Gains and Losses in the Death-rate per 1,000 persons living in the year 1898, as compared with the average Rates for the five years, 1893 to 1897.

LOSSES.

Name of Disease.	Average Rate during five years 1893—1897	Rate during 1898.	Losses per 1,000.	Probable Number of lives lost.	Lives lost or gained during 1897.
All causes	16·19	17·08	0·89	36	
Measles	0·28	0·85	0·57	23	11 saved
Typhoid Fever	0·15	0·17	0·02	...	...
Influenza	0·12	0·21	0·09	3	3 saved
Digestive Diseases ...	0·61	1·61	1·00	40	9 saved
Urinary Diseases ...	0·16	0·21	0·05	2	3 saved
Other Tubercular Diseases (excluding Tabes Mesenterica ...)	0·31	0·56	0·25	10	2 saved
Tabes Mesenterica ...	0·42	0·43	0·01	...	5 saved
Ill-defined	0·77	1·71	0·94	38	9 saved
Violence	0·41	0·75	0·34	13	7 saved
Gross Losses ... ..	...	...	3·27	129	

NETT LOSS ... 0·89, or 36 lives.

N.B.—The death of one person in a population of 40,910 corresponds to a rate of 0.0244 per 1,000. Hence a saving or a loss of a rate of—

0.0244 means the saving or loss of 1 human life.
 similarly 0.122 „ „ „ 5 „ lives.
 and 0.244 „ „ „ 10 „ „

It is a matter for regret that we have an adverse balance to shew this year which, curiously, almost exactly corresponds to the gain recorded last year. Not only that but in 1898 the losses were almost entirely in the same disease groups as those in which we gained during 1897.

The only redeeming feature upon which one can seize here is the fact that whereas in 1897 the gains and losses in the *preventible* diseases exactly neutralised each other (each being 31), in 1898 the gains were 42 and the losses only 33, there being in spite of the severe epidemic of Measles a gain of nine lives in those diseases the prevalence of which can be to some extent controlled.

TABLE 33.—Description of persons who have died during the year in the professional or commercial classes, in the artisan and labouring classes, and in the non-productive classes—annuitants, pensioners, “no occupation.”

In Active Work.

Males.			Females.			Males.			Females.		
Angle-Iron Smith ...	1		Brickmaker	...	1						
Assist. Schoolmistress			Cab Driver	...	1						
Bailiff ...	1		Carter ...	...	3						
Barmaid ...		1	Civil Engineer	...	1						
Boilermaker ...	5		Clerk ...	...	1						
Book-keeper ...	1		Cloth Presser	...	1	1					
Brass Finisher ...	1		Domestic Servant ...			10					
Bricklayer ...	2		Draper's Assistant...	1							

In Active Work.

	Males.	Females.		Males.	Females.
Dressmaker ...		1	Railway Shunter...	2	
Electrical Fitter ...	1		Railway Traffic In-		
Engine Driver ...	2		spector ...	1	
Engine Fitter ...	18		Rivetter ...	1	
Farmer ...	2		Sawyer ...	1	
Forgeman ...	1		Solicitor ...	1	
Gas Stoker ...	1		Tailor ...	1	
General Smith ...	1		Tailoress ...		2
Grocer ...	2		Timekeeper ...	1	
Hawker ...	1		Tinsmith ...	1	
Hospital Nurse ...		1	Tool Smith ...	1	
Innkeeper ...	1		Verger ...	1	
Iron Dresser ...	1		Wood Turner ...	1	
Iron Moulder ...	4			—	—
Iron Turner ...	2			141	19
Joiner ...	3			—	—
Labourer ...	47				
Locomotive Fireman	1		<i>Retired from Work.</i>		
Locomotive Inspector	1		Annuitant ...	1	2
Machinist ...	5	2	Of Independent Means	1	
Millwright ...	1		Retired Blacksmith	1	
Painter ...	7		„ Farm Bailiff	1	
Pawnbroker ...	1		„ Farmer ...	1	
Printer ...	1		„ Gardener ...	1	
Proprietor of Travell-			„ Steel Melter	1	
ing Show ...	1			—	—
R'lway Brakesman	2			7	2
Railway Fireman ...	1			—	—
Railway Guard ...	1		No occupation ...	2	

TABLE 34.—Shewing Birth and Death Rates in certain other towns during 1898 :—

	Population (Estimated) (1898).	Birth-rate per 1,000.	Death-rate per 1,000.	Zymotic Death-rate.	Respiratory Death-rate.	Phthisis Death-rate.	Death-rate from other forms of Tuberculosis.	Infant Deaths per 1,000 Births.
England and Wales	...	29·4	17·6	2·22	...	...	...	161
Aston Manor ...	80,916	31·6	15·1	2·9	4·3	1·04	...	186
Ashton-under Lyne }	44,700	26·5	19·1	1·7	3·07	1·8	0·6	195·3
Congleton ...	10,744	29·3	18·4	0·9	3·9	1·6	Not calculated	139
Chesterfield ...	24,934	35·3	21·6	3·6	3·9	1·2	0·8	228
Dudley ...	48,680	35·72	23·17	6·1	3·9	0·78	0·6	209
Eccles ...	35,000	26·6	16·6	3·2	2·7	1·2	...	176
Hyde ...	32,617	28·0	18·2	2·7	...	...	...	...
Lancaster ...	36,545	27·99	14·09	2·10	2·65	1·59	...	158
Lytham ...	5,950	19·5	12·9	0·8	2·5	0·8	Nil	198
Macclesfield ...	36,000	26·4	18·5	1·9	2·3	2·1	*	174
Northwich ...	18,300	35·5	19·61	2·34†	3·05	1·03	...	187
Runcorn ...	18,000	31·6	19·1	4·0	...	...	...	...
Southport ...	49,678	19·71	14·49	0·81	2·34	1·41 nearly	0·71	138
Stafford ...	21,937‡	27·95	15·91	1·96	2·5	1·62	0·37	135
Stalybridge ...	28,429	27·1	24·8	3·3	...	...	...	239
Stockport ...	81,000	29·4	20·3	4·0	4·09	1·8	...	231
Stoke-on-Trent ...	28,176	32·7	18·34	4·2	2·48	1·63	...	166·2
Wallasey ...	46,800	28·1	16·5	1·7	...	...	...	...
Widnes ...	32,000	33·8	16·8	0·9†	4·7	0·3	...	...
Wigan ...	61,697	34·49	18·88	2·45	4·41	0·93	0·17§	170
Winsford ...	10,810	32·5	14·8	1·9**	2·8	1·0	0·1	148
Wolverhampton..	88,051	35·7	21·0	3·7	3·6	1·2	0·7	202

* All Tuberculosis included under Phthisis.

† Diarrhœa is not included in these Zymotic Death-rates.

§ Including Wasting Diseases of Infants, this would be 3·17.

** Diarrhœa is responsible for a Death-rate of 1·6, which is included in the

‡ Including 1,990 in the Public Institutions.

[figures given.

Isolation Hospital.

The following is a statement of the cases treated in the Hospital during the year:—

	Scarlet Fever.	Typhoid Fever.	Typhus Fever.	Small- pox.
Remaining in Hospital at the end of 1897	17	3	0	0
Admitted during 1898 	40	22	1	1
	—	—	—	—
Total 	57	25	1	1
	—	—	—	—
Discharged during 1898 	49	17	0	1
Died during 1898 	1	5	1	0
Remaining in Hospital at end of 1898 ...	7	3	0	0

In addition to the above, one case admitted from an outside district as Typhoid Fever died 11 days after admission of Acute Inflammation of the Brain, and one case of a vagrant in transit admitted as Scarlet Fever was discharged after being kept under observation for two days. Of the above cases three of Scarlet Fever and the one mentioned above as having been admitted for Typhoid Fever were from districts outside the Borough.

The figures given are more than sufficient to dispose of the statements which were frequently made at one time that the Hospital would never be used.

The average duration of stay in Hospital of Scarlet Fever cases has been 48 days, the maximum being 74 and the minimum 25 days.

Of the Enteric Fever cases, the average duration of stay has been 56½ days, and the maximum and minimum 95 and 36 days respectively.

In both of the above averages those cases where death has occurred have not been reckoned.

Towards the end of October a case of Scarlet Fever in the Hospital developed Diphtheria, which was confirmed by bacteriological examination, and had to be specially isolated. The case which was complicated with Pleurisy and Broncho-Pneumonia proved rapidly fatal in spite of the antitoxin treatment. A prompt preventive inoculation of all contact cases prevented any spread whatever of the disease.

Even the most lukewarm of its supporters finds himself bound to admit that the Isolation Hospital has done splendid service in lessening the spread of dangerous infectious disease, in saving the lives of many persons who would in all human probability have died had they been left in their frequently filthy, squalid and dangerous surroundings, in shortening the duration of illness and thereby lessening the chance of future poverty, and in guarding the sufferers from those dangerous diseases against the onset of complications of illness which might handicap them for life. Let anyone who is still sceptical inquire of these families to whose relief the Isolation Hospital has come in time of need and danger, and they cannot, however narrow-minded they may be, fail to be convinced that the above-mentioned advantages have been fully reaped.

There is still a tendency on the part of some of the Members of the Council to judge of the value of the Hospital by the number of cases treated there during the year. Let me once more, therefore, and at the risk of repeating myself, impress upon you that this is no guide to the usefulness of such an Institution. If a large number of cases had been treated there, it would have shewn that the Hospital had failed in its primary function, namely, the prevention of the spread of disease. In the same way I regard it as a wrong way of stating the case to compare different Hospitals in efficiency of administration and general utility, using as a basis of comparison the cost per patient per week, and so forth. On that basis the probability would be that the Hospital which had been most efficient in its primary purpose would also be the most costly, and that which had been the least efficient would be the least costly. To put the matter in hyperbole for the sake of emphasis, if the Isolation Hospital were empty for the want of cases to be isolated all the year round this would be the surest sign of its having effected the main purpose for which it was erected.

In my last Annual Report in remarking on the question of charging patients the expenses of their maintenance, I expressed the opinion that though your Committee had opened the General Wards of the Hospital free of charge to non-pauper residents of the Borough, you might find it advisable at some future time to re-consider that decision. One of your Committee has suggested that, inasmuch as Crewe is the

head-quarters of many railway workers who are simply temporary lodgers in the town and contribute practically nothing towards its rateable value, a small charge might be made to such patients—say a shilling a day or thereabouts—to cover the cost of food and drink. The suggestion is a valuable one and might be adopted in those cases where the lodger is really only a temporary one. But there are, it must be remembered, numerous persons in Crewe who are practically permanent lodgers, and I do not think that—for the present at any rate—a charge should be made to them. If ever a small charge is fixed for the use of the General Wards by the ratepayers as a whole, then I think the latter class might be included, but the time is by no means ripe for that yet, and probably will not be for several years. In the matter of the machinery of the administration, as was to be expected, the Hospital was a little time before she found herself, but now the day's work is smoothly, regularly and well carried on. It is only those who are untutored by experience who think such an Institution can be worked on the lines of "absolute unvarying rigidity." Judicious giving and taking is required, and so long as this has not transgressed the laws of prevention of disease, or dipped too deeply into the Municipal Purse, my policy has been to allow a little play in the working of the regulations.

Your Matron and the Nurses under her charge have fulfilled the highest expectations, and have time after time been complimented by the Medical Men attending cases in the Hospital for their care and skill in nursing. I cannot help alluding in terms of the highest praise to Nurse Ellen Gertrude Goulden, who lost her life from Typhus Fever in the discharge of her duty under circumstances detailed in the appended Special Report, and which are too sad for comment. The manner in which your Matron and Nurses bore themselves during that most trying period proved them to be of the stuff of which heroines are made.

The appreciation in which those of the public who have had experience of the Hospital hold it is shewn, amongst other things, by the presents which they have made to it, to add to its beauty and comfort. Even the poorest will not be outdone in shewing their thanks in a practical manner, and not a week passes but the Hospital is made the recipient of sundry tokens of gratitude from former patients and their friends.

During the year communications have been received from surrounding districts (doubtless on account of the pressure put upon them by the County Council), asking that we should undertake to receive any infectious cases which might specially require isolation. The answer of your Committee has been that whilst we cannot guarantee any accommodation whatever, we shall be glad to receive a limited number of cases so long as we have room. This admission of cases from outside districts will of course have to be carefully watched, for every case admitted will have to remain in the Hospital for about six weeks, and during that time much may develop. Your Committee has revised the charges for patients from outside districts, so that they now stand as follows for maintenance, nursing, etc., exclusive of medical attendance:—

		Adults.	Children under 12
General Wards per week	... ..	£4/4/0	... £3/3/0
Private ,, ,, ,,	... ..	£5/5/0	... £4/4/0

Plus 5/- for hire of Ambulance and actual cost of horse hire.

I have adhered to the plan of keeping a small permanent staff constantly in the Hospital believing, in common with the general experience in such matters, that it is not only better, but also cheaper to do so than to keep a couple of nurses and engage private nurses as required. A further experience has strongly confirmed my opinion, and your Committee, I think, are now convinced that it is not only the wisest but the least expensive course.

THE COST OF MAINTENANCE of the Hospital from January to December has been approximately as stated hereunder. I am unable to give the exact figures as some of the accounts for the year are not yet closed. Still the statement may be taken as well on the safe side.

	£	s.	d.
Coals, Firewood, Slack, etc.	88	11	6
Groceries	131	7	6
Meat	84	5	0
Fish, Ice, etc....	23	5	0
Milk and Eggs	65	17	0
Vegetables, etc.	14	10	0
Bread	34	10	0
Stimulants	25	5	0
Druggist's Sundries	46	10	0
Drapery, etc.	11	0	0
Crockery	4	19	0
Ironware	4	5	0
Sundries	5	17	0
Gas	47	10	0
Water	14	0	0
Rates and Taxes	18	10	0
Insurance	5	0	0
Salaries and Wages—including Uniform	247	0	0
*Ditto—Ambulance Attendant	65	0	0
*Horse Hire (Ambulance)	45	0	0
Printing, Stationery, etc.	14	0	0
Occasional hire of extra Nurses	16	0	0
Telephone communication	8	0	0
	£1020	2	0

* The Ambulance Attendant also acts as Chief Disinfecter for the Health Department, and the horse-hire includes that necessary in many cases of disinfection.

It was found necessary in the early part of the year to apply to the Local Government Board for a supplemental loan of £600 to cover the increased cost of the Hospital over the estimate, and to provide a little money for the laying out of the grounds and the decoration of the internal wall-surfaces.

About 1,000 loads of soil have been carted on to the grounds, and at the time of writing there has been a double row of trees planted round the boundary walls, a large number of shrubs planted inside the

grounds, and a large vegetable garden provided; the whole of the work being kindly superintended by Mr. Latimer, the Park Curator. The cost of this work will not, I am afraid, fall far short of £200.

Notification of Infectious Disease.

During the year the following notifications have been received:—

Small-pox	...	...	...	1	Typhoid Fever	...	32
Scarlet Fever	...	...	...	57	Erysipelas	...	49
Diphtheria	...	...	...	36	Puerperal Fever	...	4
Membranous Croup	...	...	...	4	Typhus Fever...	...	1*
				Total	...	184.	

* This case occurred in the Isolation Hospital and was not really notified in consequence.

The cost of notification in fees paid to Medical Practitioners, which I have been asked to insert, has been as follows:—

1896 (three months)	...	...	...	...	£19	5	0
1897	...	...	...	...	£52	15	0
1898	...	...	...	...	£22	17	6

The high figure in 1897 was due to the unusual prevalence of Scarlet Fever.

Disinfection.

The following articles have been disinfected in the Washington Lyons Disinfector during the year:—

Beds	...	...	...	...	...	195
Mattresses	...	...	...	...	...	316
Pillows	...	...	...	...	...	400
Bolsters	...	...	...	...	...	188
Blankets	...	...	...	...	...	333
Sheets	...	...	...	...	...	287
Carpets	...	...	...	...	...	22
Rugs	...	...	...	...	...	15
Counterpanes, etc.	...	...	...	...	...	194

Total number of articles ... 1950

In addition to this there have been 193 houses and five schools disinfected, and 153 notices issued to re-paper, limewash, etc., after disinfection.

A rule is made of disinfecting after every case of notified infectious disease, and after fatal cases of Measles, Whooping Cough, etc. After deaths from Phthisis, or other Tubercular diseases a strong recommendation is sent to the relatives and if that fails the attending Practitioner is asked to add his persuasion. I have not yet had a single refusal in these cases.

Schools and Infectious Diseases.

During the early part of the year we had a considerable amount of trouble with Measles, necessitating the closure of several schools for a short period.

St. Barnabas' mixed school was the first to be affected, but I decided not to close on account of the children coming from a small thinly populated area immediately surrounding the school, and because the disease had practically exhausted all the susceptible material. Disinfection of the school and distribution of precautionary handbills in the neighbourhood was at once carried out.

Pedley Street schools were next affected, a somewhat curious circumstance, seeing that this and the above-named school are as far away from each other as any two schools in the Brough, and that the two zones from which scholars are drawn are entirely separate. About a fortnight after the commencement of the disease in St. Barnabas' mixed schools an outbreak occurred in the infant school and almost at the same time the Pedley Street infant school shewed distinct evidences of the same thing. Without further delay, therefore, these two infant schools were closed for three weeks.

During the next three months the epidemic extended to Hightown Wesleyan infants' school and Edleston Road infants' school, and at once these two departments were closed. Later on St. Mary's school was closed for about three weeks. Immediately after school closure in each instance the schools were thoroughly disinfected. The Managers of Sunday schools were also asked to co-operate with the Authority in closing their schools. Whether owing to the closure of the schools or not, the disease afterwards rapidly disappeared.

In the early part of the year I drew up for the guidance of School Teachers a placard setting out in simple language the signs of the more common infectious diseases, and grouping separately (*a*) those in which every child from the infected house should be kept away from school, and (*b*) those in which only the affected child need remain at home.

Your Committee resolved to share with the School Attendance Committee the cost of printing on stout card a sufficient number of these to allow of one being hung in every school class-room in the Borough. They are highly appreciated by the Teachers, and I believe have had a beneficial effect on the attendance. Formerly, either disease was spread by the attendance of children who should have been kept at home, or the attendance was unduly diminished by children being kept at home who might just as well have been at school.

The placards have been of good effect too in enabling School Teachers to call my attention to cases of dangerous infectious disease which had been of a mild character and which had, therefore, never been seen by a Medical Man. In this way three cases of Scarlet Fever were brought to my knowledge; the children were peeling freely and actually in one case the child was picking flakes of skin off its fingers and passing them along the form to other children in the class, some of whom were putting the skin in their mouths! In another case I obtained from a certain school the names of about a dozen children who were absent on account of alleged "sore throat," "colds," "feverish colds," "swollen necks," "mumps," etc., and on visiting the houses I found one child whom I strongly suspected of having had Scarlet Fever which had been concealed, and another child who was running about in the yard with a fully developed Scarlet Fever rash.

Such facts as these demonstrate the necessity of keeping a strict watch over absentees from school.

Most of the Teachers are extremely loyal in reporting suspicious cases to me at the earliest possible moment; others require frequent stimulation, and do not send information for it may be weeks after the occurrence of cases.

The sanitary condition of the out-offices in connection particularly with the Edleston Road boys' school has several times been made the

subject of strong complaint. One of the older boys is used as a kind of caretaker, and it is made his duty to turn on the tap of the automatic flush-tank in connection with the closets at certain times; needless to say he often forgets his duty. Such an arrangement is not at all to be relied upon, and should be discarded.

During the year the following cases have been reported by the School Teachers. In every single case certificates of exclusion were sent to the schools, and in all but cases of Ringworm and Eczema, cautions were sent to the parents. This involved the issue of no less than 1,830 notices. A list of infected houses and new cases of infectious disease is given to the School Attendance Officer, every Monday morning.

	Central Ward.	West Ward.	North Ward.	South Ward.	TOTAL.
Measles	73	251	121	288	733
Whooping Cough	9	15	6	16	46
Mumps	28	22	13	43	106
Chicken-pox	2	4	3	13	22
"Fever," &c. ... ..	...	...	...	4	4
Eczema	4	..	...	...	4
Ringworm ... ..	...	1	...	3	4
TOTAL... ..	116	293	143	367	919

The following certificates have also been issued by me in respect of *notified* diseases:—

Preliminary certificates	43
Final certificates	33
Total ...	76

Inspections.

During the year I have made **1,743** inspections of premises either in connection with cases of infectious illness or in consequence of complaints received, etc., as compared with 1,055 in 1897. It has been found quite impossible to carry out a house-to-house inspection, except on a very small scale. During the summer months I made a point of inspecting a few hundred houses in the dirtier parts of the town, where epidemic Diarrhœa had been unusually prevalent during the previous year, and succeeded in getting a number of insanitary conditions put to rights before the annual wave of this disease made its appearance. This is a work which requires developing, but as I have before pointed out it is impossible to attempt it with the staff at my disposal.

The following premises have been for the most part kept under supervision :—

	Borough	Central Ward.	West Ward.	North Ward.	South Ward.
Bakehouses	23	7	4	7	5
Cow-sheds	59	4	15	30	10
Dairies and Milk-shops	50	14	15	7	14
Lodging Houses	7	5	...	1	1
Slaughter-houses	13	6	2	1	4
Factories	41	18	9	6	8
Workshops	72	33	12	8	19
Laundries	2	...	...	...	2
TOTAL	267	87	57	60	63

The following statement represents a portion, but only a portion, of the work of your Inspector during the past year.

It must be remembered that all the notices issued in respect of the matters named below imply at least two visits—one preliminary to the issue of the notice and one at a subsequent date to ascertain if

the work specified has been carried out. More usually four or five visits are necessary, the Inspector meeting the owner at the property to discuss the necessary alterations, and subsequently meeting the Contractor once or twice to explain the same things to him.

CASES DEALT WITH BY INSPECTOR OF NUISANCES DURING YEAR 1898.

Defective house drainage	...	...	...	...	...	...	...	...	568
„ Manure Receptacle	...	...	...	...	...	...	...	...	1
„ Ashpits	...	...	...	...	...	...	...	...	112
„ Paving of Yards	...	...	...	...	...	...	...	...	15
„ Privy-middens, fixed Receptacles, and Cesspool Privies	...	...	...	...	...	...	...	...	163
„ Pail Closets	...	...	...	...	...	...	...	...	58
„ Water Closets	...	...	...	...	...	...	...	...	39
„ Waste Water Closets	...	...	...	...	...	...	...	...	12
Nuisances from Offensive Accumulations	...	...	...	...	...	...	...	...	12
„ „ Keeping of Swine, etc.	...	...	...	...	...	...	...	...	2
„ „ Stagnant Water in Cellars	...	...	...	...	...	...	...	...	11
„ „ Offensive Pools, Ditches, and Watercourses	...	...	...	...	...	...	...	...	8
„ „ Smoke	...	...	...	...	...	...	...	...	4
„ „ Dirty Back Passages, etc.	...	...	...	...	...	...	...	...	9
„ „ Defective Urinals	...	...	...	...	...	...	...	...	1
„ „ Other matters	...	...	...	...	...	...	...	...	49

In addition, your Inspector carries out a number of duties under the Towns Police Clauses Act, and the Towns Improvement Clauses Act, which in most towns usually fall to the lot of the police. He is also Hackney Carriage Inspector and Inspector under the Contagious Diseases (Animals) Act.

Bakehouses.

All the bakehouses in the Borough are retail and therefore come under my direct supervision. Most of them have been visited during the year, and suggestions made or notices served for their improvement.

Few of them are entirely satisfactory and their general condition may be imagined when I state that a suggestion on my part that the floors should be swilled or washed at least once a week was received with consternation. It was stated that once a month or even less often was quite enough. The fact of the matter is the majority are

very small places with but one room in which to bake and store flour and coals, and when the floor is swilled the flour-sacks have to be removed. The places, however, are as a rule swept daily and regularly limewashed.

In three instances I had to request the removal of drain-inlets from bakehouses.

Dairies, Cow-sheds, and Milk Shops.

An inspection has been made of most of the cow-sheds within the Borough, and in all but a few instances revealed a lamentable state of affairs.

The cubic space in some instances fell as low as 200 feet per cow—half as much as a human being requires. Most of the shippens were scarcely lighted at all, and it was as much as one could do to stand upright in many.

The knowledge of this led me to advise your Committee to revise and bring up to date your old regulations, which were both elastic and porous. A special meeting was held and new regulations drafted.

These were sent up to the Local Government Board for their consideration—not that such a procedure is legally necessary, but because it was deemed advisable in view of a possible contest at some future time on points involved in the regulations.

For some months the Board retained the draft regulations and finally—during the present year in fact—returned them with certain suggested amendments.

However, following closely upon this letter came a circular letter, enclosing a model series of regulations drawn up by the Local Government Board. Seeing that these fill up all the gaps in our old regulations and indeed are much on all fours with the draft adopted by your Committee early in 1898, I have advised their adoption *en bloc*. It is proposed that they shall come into force on the 29th of September, 1899.

Common Lodging-houses.

I must preface my remarks under this heading with the statement that the lodging house accommodation of the town is insufficient for its present needs. During the past year your Committee has received

applications to license three more houses as common lodging houses. One of these applications was withdrawn, but the two others—one for a house in Oak Street and the other for a house in Whitegates—were granted.

The licenses were granted under protest as it were—the localities being of course amongst the worst in the town. But it was pointed out to your Committee that whether the houses were licensed or not the occupiers would practically use them as common lodging houses, and it would be better to have them under supervision than to have them used surreptitiously.

Prior to the granting of these licenses I pointed out to your Committee that the bye-laws at the time in force did not contain any provision for the screening off of beds used by married couples, and a bye-law was specially passed to meet this omission.

There are, I am convinced, numbers of houses which are not registered for that purpose, but which are to all intents and purposes, used as common lodging houses, and we have on several occasions endeavoured to secure evidence against the most notorious of these, but without satisfactory result.

I reported to your Committee in the autumn that owing to the employment of about a thousand men on the railway extension works, a large number of houses in the South Ward were being used as houses let in lodgings. Your Committee, however, decided to take no action in the matter further than requesting me to deal with any cases of over-crowding which might be met with.

Meat Inspection.

During the year a pretty rigorous inspection of meat in the Market Hall and in all the shops in the town has been carried out. The Vigilance Committee of the Local Butchers' Association has been of some service to us in this matter, by calling our attention on two occasions during the year to unsound meat exposed for sale in the Market Hall, and by giving evidence in the Police Court on our behalf when the cases were taken for prosecution. In these two cases, however, it must be mentioned, the Vigilance Committee were dealing with persons who were not members of the Association. We have had as yet no experience of their action when members of their own Associa-

tion are concerned. Not only do the Association members watch the non-members closely, but the non-members in return watch the members. On one occasion one of the Committee failed to bring to our notice a case where unsound meat was exposed for sale, but this, so far as I know, is the only instance in which such a lapse of duty has occurred. I sent a strong remonstrance to the Association, which I venture to think bore good fruit.

In another, and perhaps a better way, the Butchers' Association has proved of service, namely, by making it a rule that when any of their members finds an animal diseased, or unsound to any extent whatever when it has been slaughtered, that the Medical Officer of Health shall be at once summoned to give an opinion as to the fitness for human food, or otherwise, of the carcase. If, after examination, the carcase proves to be unfit for food, the owner is allowed to surrender it voluntarily for destruction, signing a form kept for that purpose, and the Butchers' Association pay the owner full compensation if the animal has been bought for a sum over £8 and in a *bonâ-fide* manner.

This arrangement as to voluntary surrender is not confined to members of the Butchers' Association, but is extended to any *bonâ-fide* case. Where there is the slightest suspicion of the *bonâ-fides* the meat is formally seized and prosecution follows.

In the following cases voluntary surrender has been allowed by me :—

March 10th.—One carcase of beef in private slaughter-house :
generalised Tuberculosis.

March 26th.—One calf, deposited in Market Hall : premature
and innutritious.

May 4th.—Portion of carcase of beef, deposited in Market
Hall : injury to leg above hock. Injured portion alone
surrendered.

December 9th.—Market Hall, lungs of cow : tubercular nod-
ules some breaking down.

December 14th.—Carcase of cow, private slaughter-house :
pleura, diaphragm, peritoneum, lungs, liver, etc., all tuber-
culous. Animal weighed 5cwt. 1qr. 14lbs., and cost £13
15s. 0d.

In addition to the above cases the following meat has been formally seized as unfit for food after inspection :—

On April 7th three pieces of unsound beef were seized at the shop occupied by W. Cliff, in West Street. A prosecution was instituted and the defendant was fined £2 and £4 14s. costs, in default of payment distraint, and in default of distraint six weeks imprisonment.

On October 28th the same person was fined £2 10s. with £2 16s. costs, or in default two months imprisonment for exposing for sale two pieces of unsound beef.

On November 8th William Brierley was fined £5 with £2 18s. 6d. costs, or in default two months imprisonment for exposing for sale in the Market Hall a number of pieces of beef, which were diseased and unfit for human food.

On December 6th Mrs. Elizabeth Cope was fined £1 and 2s. 6d. costs for having sold a fowl which was unsound and unfit for human food. The seizure in this case was not made until two days after the fowl had been sold, and the prosecution was taken under Section 28 of the Public Health Acts (Amendment) Act, 1890, being the first case of this kind ever tried in the Crewe Police Court.

The following notes of carcasses inspected in connection with the Butchers' Association may prove interesting as shewing our practice in such matters—a practice which follows in cases of Tuberculosis on the lines laid down by the last Royal Commission. My decision has never yet been disputed in these cases.

- 1.—Carcase of cow in Market: uniformly dark in colour; all organs healthy; no sign of disease; animal killed immediately after difficult parturition. Passed.
- 2.—Carcase of beef in private slaughter-house: few tubercular caseous nodules in both lungs; right costal pleura shewed many small tubercular nodules and recent inflammation; diaphragm shewed tubercular deposits on both pleural and peritoneal sides; peritoneum under kidney also tuberculous; liver and kidney both shewed a few tubercular nodules, and both kidney glands and deep inguinal glands

contained calcified tuberculous deposit; spleen and intestines tubercular; udder not present. Carcase was that of a four-year-old cow, was extremely well nourished and weighed 720lbs. Voluntary surrender.

- 3.—Sundry pieces of beef in Market (rump, etc.): cow injured in railway truck. Voluntary surrender of injured parts.
- 4.—Carcase of six-year-old cow in private slaughter-house: lungs shewed few nodules of old calcified tubercles; udder not present for examination; all other parts healthy, and carcase well nourished. Passed.
- 5.—Carcase of five-year-old cow in private slaughter-house: few cheesy nodules in liver, one containing pultaceous matter near surface adherent to parietal peritoneum; all other parts including udder healthy; carcase well nourished. Passed.
- 6.—Carcase of young cow in private slaughter-house: right and left costal pleura slightly tuberculous; lungs shewed four tubercular foci, two being broken down; peritoneum tubercular; liver shewed several gritty nodules; udder tuberculous, several ducts containing pus; one kidney gland tuberculous; rest of organs healthy; carcase fairly nourished. Voluntary surrender.
- 7.—Carcase of heifer, 4 years—(one calf) in private slaughter-house: diaphragmatic and both costal pleura slightly tuberculous; all other parts including udder healthy; carcase well nourished. Passed.
- 8.—Carcase of five-year-old cow: miliary tuberculosis of right and left pleura, peritoneum and both lungs; many pultaceous deposits in liver which was distinctly enlarged; few miliary nodules in both kidneys; doubtfully present in udder; large stomach tubercular on surface; all other parts apparently healthy; carcase well nourished; weighed 602lbs. and cost £13 15s. 0d. Voluntary surrender.

Slaughter-houses.

These have been kept under regular supervision, and the periodical linewashing has been particularly enforced.

I have had two informal interviews with persons desirous of erecting private slaughter-houses during the year, and have put the *pros* and *cons* of the question before them as indicated in my last Annual Report. Both persons ultimately decided to drop their schemes.

Nevertheless, the accommodation for the slaughter of animals for human food within the Borough is quite insufficient to meet the demand. In many places three or four or more butchers slaughter in the same small building, and as stated in my last Report there is not a single slaughter-house in the Borough which has not some serious defect from a public health point of view.

Complaints have been made in the public press and that too, to my own knowledge, in connection with one of the best built and best managed slaughter-houses in the town. The difficulty may be met and before long will have to be met, somewhat on the following lines.

The first necessity would be the erection of a Central Public Slaughter-house, which might perhaps be placed on the site of the Market Ground, and would there be convenient to the Market Hall and the Railway. This should be fitted up with every modern convenience, including a cold air store. The only objection I see to this as a prospective site is the fact that cattle would have to be driven through the centre of the town.

The next step would be the abolition of the various private slaughter-houses. This is always a difficult step on account of compensation, and also an expensive one. A useful prelude to it would be to prohibit, if it could be done, any person except the actual owner or occupier of the slaughter-house from killing animals on the premises.

Private slaughter-houses are—as is well known—very often run at a profit by their owners, who allow other butchers to use them for a small charge.

If this could be prevented much of the inducement to keep on private slaughter-houses would disappear and combined with the offer

of better facilities at a public abattoir at a small cost it would in many cases have the effect of causing the owner of the place to transfer his business from private to public premises.

The main objections raised by the trade against the establishment of public abattoirs are the following:—

- 1.—That it causes inconvenience to them in their business since they have to take their animals to the abattoir, slaughter them there and then bring the dead meat back to their shops. It is stated that this carrying of the meat interferes with its setting and hastens decomposition.

There is very little of the substantial in this objection. At present those butchers in Crewe who have not to carry their dead meat from the place of slaughter to the shop may practically be counted on the fingers of one hand. The large majority bring the dead meat in from Coppenhall, Shavington, Wrenbury, Wistaston, and other places round about, or else carry it from a private slaughter-house in the town to the Market Hall, or the shop. I have never heard any complaint of the above nature from butchers who have to cart their meat about in this manner.

The difficulty when it does arise, and this will be very rarely, may be met by the provision of cooling chambers, as is done at Glasgow.

- 2.—A second objection is that slaughtering in a public abattoir necessitates absence for a time from the premises where the meat is sold, and this would not only be inconvenient, but also perhaps cause loss of trade. There are very few shops, however, where there is not someone on the premises to attend to the business during the butcher's own absence.
- 3.—It is said that there is more risk of petty robbery in the case of a public abattoir than when everything is done on the butcher's own premises. This statement ignores the fact that at present private slaughter-houses can scarcely be called private at all—in practically every single one, here at all events, they are open to three or four other butchers besides the actual owner, to—

gether with their usual "hangers-on." Apart from this it is more than doubtful whether the argument could ever be seriously sustained—one would think that naturally the essence of publicity would be the avoidance of any such possibilities.

4.—Another objection is that the provision of public abattoirs would largely increase the foreign meat trade of the country. This is backed by the statements of numbers of butchers who say that the amount of risk in animals bought at home is so great that it is one which even now they only unwillingly run, whilst the risk with foreign meat is practically *nil*, and yet foreign meat is cheaper. The low price of foreign meat probably contains the whole of the core of that argument. But surely if there be such a great risk with home produce does not that at once supply the strongest possible reason for more general inspection, and more control over the circulation of such produce?

5.—It was said by one of the witnesses before the last Royal Commission on Tuberculosis that in public abattoirs the offal deteriorated in value, particularly that of sheep. The witness entirely failed either to explain or to support this statement, although several times pointedly asked to do so.

6.—It is said that the establishment of abattoirs quickly sends up the price of meat. The Duke of Westminster, however, about a year ago, in addressing the President of the Board of Agriculture, on behalf of a deputation, produced a number of telegrams bearing upon this question. One was from Birkenhead, to the effect that the price was not increased; one from Manchester—"the increased price of meat not above one-seventh per cent."; one from Glasgow—"My opinion is they do not increase the price of meat"; and one from Liverpool—"public slaughter-houses cannot have the effect of increasing the price of meat." This experience suffices to shew that the objection raised is non-existent.

It must not be understood that butchers throughout the country are all opposed to the establishment of public abattoirs. This is very far from being the case. I know of many butchers in other towns who—although they have well-fitted up private slaughter-houses—still do the

large bulk of their slaughtering at the public abattoir, finding it not only cheaper, but productive of a quicker and neater result on account of the better appliances provided.

Take too the public statements of interested persons.

Mr. James Scarlett, a butcher of from 20 to 30 years standing, and President of the Paisley United Fleshers' Society, in giving evidence before the last Royal Commission on Tuberculosis, on behalf of that Society, stated that his Society was in favour of the establishment—not only in urban but even in rural districts—of public slaughter-houses, which they did not think would cause any hardship. Mr. Scarlett would make it a penal offence for anyone to kill animals for food in any place but a public slaughter-house. Mr. John Dobbie, of the Scottish Chamber of Agriculture, submitted to the Royal Commission on Tuberculosis, resolutions of his Society in favour of the establishment of public slaughter-houses, and the abolition of private slaughterhouses.

Coming now to the other side of the question.

- 1.—Unquestionably the strongest argument that can be produced in favour of the establishment of public abattoirs is that it would render efficient and uniform inspection a possibility, whereas with all the slaughtering done in private slaughter-houses, for the most part on back premises and in out of the way places, this is almost impossible.

The inspection of meat which is carried on even in the best regulated towns, scarcely deserves a better name than casual or nominal, and it suffices merely to detect occasional cases, under which a conviction may or may not be subsequently obtained. Such a system cannot ensure to the public a proper degree of protection.

Dr. W. A. Bond in a recent paper read at the Sanitary Institute "relates that at the Holbörn abattoir when the Inspector first entered on his duties he seized 4,000 ~~tons~~ *stones* of diseased meat in three months, exclusive of diseased offal. A large number of offenders were fined or imprisoned, and yet for several years previously not a single conviction had been obtained. This proves that the public must have consumed a large quantity of diseased meat."—*Lancet*, April 8, 1899.

- 2.—But is not only efficiency of inspection which the system would secure, but also *uniformity*, and it is here that the advantage to the butchers comes in. Butchers often complain of this lack of uniformity, but cannot be quite made to see that with a number of private slaughter-houses in existence it is a most difficult matter.
- 3.—Private slaughter-houses are usually a nuisance to those residing in the neighbourhood, and I have had many complaints in this connection. The lowing of cattle when they are being kept without food as is usual just before slaughter, the squealing of pigs during slaughter, etc., prove frequently matters of considerable annoyance to the neighbourhood around a slaughter-house.
- 4.—It is an advantage to a butcher to kill in a public slaughter-house. The fact that the public know that none of his meat is killed except under inspection, acts as a kind of advertisement to him.
- 5.—In Manchester and in Glasgow the public slaughter-houses have been a financial success. In Glasgow the average revenue for the three years 1894—95—96 was £8,342 per annum, and the corresponding average expenditure for these years £4,594. The Corporation of Glasgow can thus shew a clear profit of *over £3,000 per annum* during several years.—(Minutes of evidence Royal Commission on Tuberculosis, 1898, Questions 3,511 to 3,516.) In Manchester the slaughter-house shew a profit of about three per cent., after paying ordinary expenses, chief rents and interest on capital. (*Idem*, Question 7,868.)

Seeing that under existing statutes, the utmost a Local Authority can do, is to establish public abattoirs and offer facilities for their use any attempt on the part of Local Authorities to make a profit out of such an undertaking is scarcely wise. All tolls and dues should be fixed at as low a rate as possible, consistently with the establishment paying its way.

- 6.—The butcher benefits financially, however, in a more direct manner from the use of a public abattoir. The meat is invariably better preserved, and is not exposed to the same risk of contamination by defective drains, unnecessarily close manure-receptacles and other insanitary conditions, which are only too

frequently found in private slaughter-houses. I am not in the least exaggerating this evil; the presence of manure-heaps in the closest possible proximity to the private slaughter-house is the rule and not the exception in this town.

7.—Again much of the offal and blood which is now lost in private slaughter-houses might be saved by proper appliances.

8.—This leads me to point out another and most serious objection to private slaughter-houses, viz., that a large quantity of objectionable matter passes into and makes the sewers and drains in the locality offensive. This my own experience enables me to confirm. It is due in a very large measure to carelessness, aided by improper paving and draining.

9.—In the humanitarian interest public abattoirs are to be commended as preventing much of the unnecessary cruelty inflicted upon animals in the process of slaughter. Such cruelty is generally unavoidable being caused by the want of proper appliances, the want of proper lairage at a distance from the actual place of slaughter, and so forth; but is also due at times to the slaughter of animals by untrained apprentices not under proper supervision. Both of these things may be easily avoided in public abattoirs.

I have by no means exhausted this subject, but offer the above remarks for the present consideration of your Committee.

It is a pity that the question of establishing public slaughter-houses was not considered by your Council at a much earlier time—before the town grew so large. Not only would the question of compensation have been easier of solution, but the butchers would then practically have begun on the same conditions all round, and would have grown up accustomed to public slaughtering.

Now that your Council has taken over the collection of the tolls of your own Market, it is submitted that a more fitting time could not be found to consider the question of building that most necessary adjunct to a Market in which the meat trade is so large—a *public Abattoir*.

New Buildings.

Though it scarcely belongs to my particular Department I cannot help alluding to the character of many of the new buildings constantly being put up in the town. A number of builders appear to make it their aim by saving a few shillings here and there to erect the flimsiest possible structures in the hope that they may get them off their hands before the defects are discovered. In a word, speculative building is prevalent to a serious degree in the town, and in a few years' time the town as a whole, and not merely individuals, will suffer for it. It prevails too in spite of the vigilant supervision exercised by your Surveyor's Department. This I know from the fact that I am called in very frequently to inspect recently built houses in which the results of some scamped work are being felt.

Your building bye-laws are stringent enough and only require rigorous enforcement.

My experience with the inspection of newly-built houses has convinced me very firmly of one thing—that your Council will do well to consider the appointment of a Building Inspector, before the evil grows much greater.

Many instances could be produced where working-men have invested their life's savings in what they were assured were thoroughly well-built and sanitary houses only to find out in the course of a few months that they had been, in plain language, swindled.

In this connection it cannot be too widely known that in all houses of a rateable value under £8 there is implied in the mere fact of letting a guarantee that the house so let is in every way in a good sanitary state. Damages may, and have in several cases been, recovered by tenants who rented houses of the rateable value stated.

In the case of a weekly letting this guarantee or contract is regarded as being renewed every week when the rent is received.

In September I reported to your Committee that it was the usual practice to provide no privy accommodation at all, or only that of a most unsuitable nature for workmen employed about new buildings. The men in consequence make use of some part of the house as a privy, and by some strange irony, the pantry is usually selected. I have inspected several rows of new property in erection and found

most of the pantry floors literally covered with excreta. On one occasion a carpenter complained to me of this state of affairs, saying that on this account he frequently could not enter some parts of new houses to fix the shelving, skirting-boards, etc.

As I have pointed out to your Committee, even if the filth referred to be removed before the floor is laid the pollution of the soil largely remains.

The evil is, unfortunately, one which legislation has not contemplated and, therefore, the utmost that could be done was to resolve that a notice should be affixed to every set of plans, requiring the Contractor or Builder to provide and maintain in suitable condition proper privy accommodation for all workmen, at least one pail to be provided for every 20 workmen.

It is to be hoped that in some future Factory and Workshops Act opportunity will be taken to make good what has been an obvious omission.

Sale of Food and Drugs Acts.

I am indebted to Chief Inspector Laird, of the Cheshire County Council, for the information given below. During the year 72 samples have been taken of various articles of food, etc., in the Borough.

These samples were of the following nature:—

Ale (bitter)	2	Arrowroot	2
Ale (mild)	14	Butter	14
Cinnamon	1	Milk	30
Ground Ginger	2	Milk (condensed) ...	2
Oatmeal... ..	1	Whiskey	4

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With the exception of three samples of milk, all the above were reported by the Analyst as pure. One sample of milk was returned as adulterated with six per cent. of water, and the seller was proceeded against and fined 20s. together with 18s. 6d. costs. The other two samples were reported by the Analyst as poor in quality. In these cases the sellers were cautioned, and in a month or so, fresh samples were taken from them, and these latter were found to be pure. The addition of preservatives to milk is becoming an extremely frequent occurrence, those most commonly in use being Boric Acid and Formic

Aldehyde. In Liverpool, Manchester and Birmingham a number of proceedings have been instituted against persons found to be thus adulterating milk. I am of opinion that samples of drugs should be more frequently taken in Crewe; with the exception of one sample of Rectified Spirit, no sample of drugs has been taken in the Borough for two years at least. Those of which my experience in Crewe has made me suspicious are—Camphor Liniment, Spirit of Nitrous Ether, Glycerine, Liniment of Iodine, Paregoric, Tincture of Rhubarb, Cream of Tartar, Carbonate of Iron Pills, etc.

I have conveyed this suggestion to Chief Inspector Laird, in accordance with a request from him.

School Accommodation.

At the present time there is accommodation in the schools in the Borough for 7,671 scholars, the numbers being distributed as follows:

	Schools.	Accommodation.
Central Ward .	4	2847
West Ward ...	3	1743
North Ward ...	4	1117
South Ward ...	3	1964
TOTAL ...	14	7671

Occasionally on my visits of inspection I found evidences of the accommodation being overstrained—classes being held in the cloak-rooms and porches. In such cases I have always sent word to the Inspector of Schools and your School Attendance Officer, who have taken steps to remedy the condition.

Scavenging.

This work has largely increased and is still growing. During the early part of the year a large quantity of dry ashes was deposited in various "tips" in and around the town. Care was taken in the selection of sites for this, so as to avoid as far as possible the occurrence of nuisances, but in spite of this, in April complaints were received of offensive smells from a "tip" off Hungerford Road. On visiting this, I found that the complaints were well founded; the tipping was at once stopped and measures were taken to abate the nuisance. In June I was asked to tip a few thousand loads of dry ashes in a disused clay-pit off Hungerford Road, but on visiting it, I found it quite unsuited for the purpose, being near houses and near a road, and thus likely to cause a serious nuisance. I therefore declined to allow any tipping there.

A number of loads of ashes were later in the year tipped, by request, in the Crewe Alexandra Recreation Ground, but a nuisance and injury to the road by the extraordinary traffic being complained of this was also stopped. With the exception of a very few loads from the outskirts of the Borough, all the ashes are now being taken to the Sewage Farm. The cost to the Sanitary Department is proving to be a very serious matter, as I foretold your Committee would be the case. This matter is more fully discussed in a Special Report now ready and shortly to be presented to your Committee.

In the early part of the year the whole of the night and day staff were provided with water-proof coats, leggings and Sou'westers, on the understanding that their work would have to be done in all weathers; previously the work had to be suspended in wet weather, and serious disorganisation of the house-to-house system resulted. On only one occasion has there been any trouble with the staff—that is committing occasional cases of drunkenness, which are dealt with out of hand. This was shortly after the provision of the water-proofs, when a portion of the staff refused to turn out one wet night, alleging that the water-proofs gave no protection against the rain. I had the men up, examined the water-proofs, found there was no ground whatever for complaint, and accordingly stopped half-a-day's pay per man. There has been no trouble on that score since.

Cost of Removal of Refuse.

By a careful attention to detail on the part of your Foreman, of whose ability I cannot but speak in the highest praise, and by increasing the amount of house-to-house work, the cost per load of refuse removal has been maintained at the same figure as last year. I regard that as a distinct achievement, for during a considerable time towards the end of the year the day refuse had to be sent from every part of the Borough to the Farm. In addition to this, the amount of night work has increased. It is a most noticeable fact that though the work now done is almost half as much again as in 1894, the cost has been reduced by ninepence per load. This, in my opinion, is chiefly due to the establishment of a regular and frequent system of scavenging in the place of the old hap-hazard method. By the establishment of a daily system of collection, I think it could be yet considerably reduced.

	1894.	1895.	1896.	1897.	1898.
Privies and Ashpits } ...	11,969	12,919	17,788	25,383	32,051
Emptied					
Privy Pails Emptied ...	99,010	109,374	110,996	114,368	135,468
Dust-bins Emptied ...	56,619	62,200	65,170	67,700	78,048
NUMBER OF LOADS REMOVED:—					
Day Work ...	5,367	5,462	6,639	7,558	8,313
Night Work ...	4,496	4,914	4,769	4,851	4,978
	9,863	10,376	11,408	12,409	13,291
	£ s. d.	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Total Cost ...	2187 1 4	2180 15 3	2243 0 10	2277 6 8	2486 7 7
Cost per Load ...	0 4 5½	0 4 2½	0 3 11½	0 3 8½	0 3 8½
Cost of Day Work, per load ...				0 2 7½	0 2 7¼
Cost of Night Work. „ ...				0 5 3½	0 5 7½

Reconstruction of Privies and Ashpits.

A number of fixed receptacles, cesspool privies, uncovered privy-middens, etc., have been re-constructed during the year on notice from the Department.

The Railway Company have altered about 30 privy-middens in Sandbach and Charles Streets to tipper-closets on their own initiative.

So far as can be ascertained, there are now within the Borough :--

2814 Water Closets.	1564 Uncovered Privy-middens.
862 Waste Water Closets.	288 Covered ditto.
2685 Pail Closets.	3443 Dustbins.
255 Cesspool Privies.	232 Uncovered Ashpits.
65 Fixed Receptacles.	1983 Covered ditto.

The variation in the above figures as compared with those of last year is of course due principally to the erection of new houses.

A Special Report upon this question is appended.

Water-supply.

In January I made an inspection of two reservoirs, filters, etc., supplying water to the Borough, accompanied by the Borough Surveyor and Mr. Hignett, Outdoor Superintendent, the latter of whom left nothing undone to assist us in our inquiry. The results of that inspection were submitted in the form of a Special Report, which is also embodied in the minutes of the Council, so that no repetition of it is necessary here.

In August a sample of water from a house-tap in Wistaston Road was sent to me and found to contain swarms of anguillulæ or water-eels. After making enquiries which proved that the case was a genuine one, I prepared a few mounted specimens and sent these together with a sample of the water to Mr. F. W. Webb, who at once promised to do whatever he could in the matter. I have had no other complaint either at that or any other time about the quality of the water, which I consider excellent.

TABLE 36.—Water supplied in Crewe per annum, consumption per head per day, &c.

Year.	Quantity consumed during year in gallons.	No. of Inhabited Houses.	Population.	Consumption per house per annum in gallons.	Consumption per head of population per day in gallons.
1881	65,562,000	4,588	24,385	14,290	7·36
1882	57,270,000	4,967	24,835	11,530	6·31
1883	62,886,000	5,062	25,310	12,423	6·80
1884	70,887,000	5,162	25,810	13,732	7·42
1885	82,953,000	5,267	26,335	15,749	8·63
1886	77,604,000	5,378	26,890	14,428	7·35
1887	81,611,000	5,445	27,225	14,988	8·21
1888	93,475,000	5,542	27,712	16,866	9·31
1889	86,398,000	5,612	28,060	15,395	8·43
1890	83,014,000	5,773	28,766	14,379	7·97
1891	86,793,000	6,542	32,783	13,267	7·25
1892	85,028,000	6,816	34,080	12,474	6·83
1893	95,848,000	7,125	35,388	13,452	7·42
1894	113,769,300	7,190	35,950	15,823	8·67
1895	119,236,000	7,404	37,020	16,104	8·82
1896	128,333,000	7,638	38,190	16,802	9·20
1897	128,588,000	7,945	39,725	16,183	9·07
1898	140,055,000	8,182	40,910	17,117	9·37

The figures for 1891 and all succeeding years apply to the extended Borough; those previous to 1891 apply only to the old Borough (Church Ceppenhall excluded).

The figures giving the quantity of water consumed are taken from the accounts of the L. & N. W. Rly Co., and represent the water paid for by the Corporation; these accounts are made out from November 30th each year.

Rivers Pollution and Sewage Disposal.

During the year the County Council, through their Medical Officer of Health, have made several inspections of the Sewage Farm, and samples of effluent have been taken for analysis. On the first occasion on which samples were taken, September 20th, the following remarks are made by the County Medical Officer of Health in his official Report.

“ In the course of inspection and inquiries it was noted :—

1. That, owing to the large amount of sewage to be dealt with, the receiving tank fills so quickly that it is difficult pumping $11\frac{1}{2}$ hours a day to reduce the sewage therein sufficiently to prevent an overflow during the night into the North brook. As a matter of fact, there seems little doubt that the tank overflow-pipe does not infrequently come into action during the night, crude sewage being in this way poured into the North brook.

2. That as regards the South side of the Farm, the storm overflows come into action with very slight increase in the ordinary flow of sewage. Thus there is little doubt that crude sewage is not infrequently poured into the South brook.

However, it is not only when overflow pipes discharge crude sewage into the brooks the pollution takes place. As was pointed out in the principal Report, parts of the Farm appear to be clay-loam, and parts strong clay ; therefore, not very good results can be expected from the broad irrigation of such land. Thus, much sewage after passing over the land is little improved, and the effluents reaching the brooks are unsatisfactory. On September 20th, it was obvious from the odour and appearance of the effluents that they were bad. Two samples were taken of effluents passing into the North brook at outlets about 200 yards apart, and one was taken of an effluent passing into the South brook. These were submitted to the County Analyst for analysis, and his remarks thereon are as follows :—

(A detailed analysis is given which need not be reproduced here).

Effluent No. 1, discharged into North Brook.	Effluent No. 2, discharged into North Brook.	Effluent discharged into South Brook.
Very bad effluent containing 7 grains of suspended matter.	Very bad effluent containing 5 grains of suspended matter.	Not a good effluent, but better than Nos. 1 and 2. It contains 3 grains of suspended matter.
Should be allowed to settle in tanks or passed through a cinder filter.	Should be allowed to settle in tanks or passed through a cinder filter.	Should be passed through a cinder filter.

The County Medical Officer of Health is, therefore, of opinion that the Crewe Corporation are not using the best practicable and available means for dealing with their sewage."

These facts were brought to the notice of the Chairman of the Special Sewage Committee, and it was resolved at once to carry into effect certain measures to improve the effluent and to prevent the occasional discharge of crude sewage into the North brook. These measures included longer hours of pumping, the removal of deposited sludge from the receiving tanks, and the sending of a further quantity of dry ashes to the Farm to be ploughed and dug into the soil.

On November 29th, a further visit of inspection was made, and three samples were again taken. Whether owing to the adoption of the above measures or not one of the samples taken on this visit (the one taken from the South side of the Farm above the osier-beds) was favourably reported upon by the County Analyst. The two others were condemned, one in very strong terms.

As your Council probably know well the question is by no means settled yet, and should not be allowed to drift. I have felt it my duty on three separate occasions, in spite of the most unpleasant position it has placed me in, to speak out on this subject to the Sewage Committee. As an official entrusted with the safeguarding of the health interests and general sanitation of your Borough, I have a distinct responsibility in this matter of which I am very sensible. I have determined that no fear of possible unpleasant consequences shall make me shirk what I conceive to be my duty, and I therefore repeat here in essence what I have on those three occasions stated to the Sewage Committee of this Council.

I have the satisfaction of knowing that my opinions are supported in principle, and for the greatest part in detail, also, by many Members of your Council, by your Borough Surveyor, and by the County Medical Officer of Health.

I do not of course put forward my views as the correct and the only possible correct views of the question; they are, however, opinions formed after having personally made numerous inspections of all parts of your Sewage Farm and after having analysed numerous samples of crude sewage, effluents from all parts of the Farm and the two brooks into which the effluents pass at various parts of their course within and without the Borough.

1. From the nature of the soil of which the Farm land is composed, and which is almost universally a thick clay with a few inches of porous soil on the top, and from the area of such land which is systematically used for sewage disposal purposes, I am of opinion that a satisfactory effluent will be but rarely obtained under the existing system.

For broad irrigation without any previous precipitation and with a stiff clay soil it is now generally recognised that *at least* one acre for every 40 persons is necessary, and that one acre for every 25 persons is a safer limit. Your Sewage Farm has a gross area of about 260 acres, or excluding homestead, farm-roads, etc., a net available area of about 220 acres. This is utilised somewhat as follows :—

Rye Grass	...	...	...	120	acres.
Cereals	...	...	...	72	„
Osiers	...	...	...	14	„
Turnips etc.	...	...	...	10	„
Total				216	„

By no means the whole of the above area is utilised at one time for sewage disposal purposes—the portion devoted to cereals of course being only used between harvesting and sowing, or, roughly speaking, a little over half the year. Even if the whole area of 220 acres were constantly utilised for sewage irrigation there would be approximately the sewage of 180 persons to be dealt with per acre, and under present conditions, in my opinion, it cannot—and does not—exert a sufficient and proper purifying influence on such an amount. In this connection it must not be forgotten that the increased amount of pumping (operations now being continued during 22 hours out of the 24) not only adds largely to the amount of sewage to be dealt with by the land as compared with former times, but also renders it very difficult to carry out the essence of land treatment—regular and frequent intermittence in application.

The plan which now pertains and which is regarded by some as a positive panacea for all the troubles arising at the Sewage Farm, namely—the ploughing in and digging in of ashes, is one which is very expensive not only to the Farm but also to the Sanitary Department, and, moreover, is one which will result, if in any benefit at all, in only a temporary and comparatively trifling one.

The cost being divided between two Departments has the appearance of being smaller than it really is. But the two added together come to an amount which would astonish the advocates of this policy did they know it.

In a recent book on Sewage Purification an instance is given of a small rural township in a neighbouring county where £1,153 was thus spent in digging ashes into heavy clay soil without any appreciable result whatever. If such a thing occurs with a rural population what are we to expect with a population of 40,000 ?

3. That the remedy for the difficulty which here confronts your Council lies in the adoption of some bacterial system of treatment for the whole or part of your sewage. Such a system might for example deal with the sewage conveyed by the Northern outfall sewer on the North side of the Farm on the slope between the carrier and the North Brook (the position of the carrier being altered if necessary), and with the sewage conveyed by the Southern outfall sewer by tapping it at a point before it merges into the "drift" sewer, and conveying it on to cinder or coal filters on a site near to the Southern willowbeds. To the Borough Surveyor, it is believed, is due the credit for the latter part of this suggestion. By the adoption of such a plan it might be possible to dispense entirely with any necessity for pumping, which entails an increasing and large annual expense.

It might be possible again to utilise the existing receiving tanks as septic tanks and syphon or pump the effluent on to land or filter beds on the West side of Minshull New Road.

Still another suggestion is that the various effluents should be gathered together and passed over a rough cinder filter before being turned into the Brooks. This appears feasible, but would still necessitate pumping and the passing of the sewage over a large area of land.

In short, I am of opinion that without serious difficulty or expense it would be possible to secure regularly what you are now unable except on very rare occasions to secure, namely—satisfactory sewage effluents, and that too with methods compared with which the present methods are cumbrous, enormously expensive and most difficult of proper management. *Land filtration is, so to speak, a diffuse and, therefore, expensive bacterial method; cinder filtration is the same thing concentrated and cheap.*

Having thus recorded what I am bound by the duties of my office to state, I now leave the whole matter in the hands of your Council, with whom also will rest the responsibility.

TABLE 37.—Shewing the amount of Sewage which passed down the main outfall sewers, the amount of water supplied by the Corporation water mains, and the rainfall in each of 13 lunar months.

Four Weeks ending	Sewage in gallons.	Water in gallons.	Rainfall in inches. (Calendar Months).
January 8th ...	29,252,640	9,992,310	2.99
February 5th ...	25,357,000	10,101,140	6.78
March 5th ...	42,474,000	9,853,051	3.12
April 2nd ...	39,741,600	9,768,110	} 4.78
April 30th ...	38,974,000	10,404,300	
May 28th ...	41,151,000	10,783,420	5.96
June 25th ...	29,133,320	11,267,174	3.79
July 23rd ...	29,133,000	11,338,516	1.53
August 20th ...	32,876,000	11,672,380	5.69
September 17th ...	36,738,000	11,771,830	1.59
October 15th ...	33,540,000	11,536,980	5.50
November 12th ...	...	11,918,970	4.34
December 10th ...	...	11,334,590	5.95
TOTAL ...	...	141,742,771	52.00

N.B.—No figures of the sewage flow are obtainable for November and December, as the gauges were removed at the end of October for repairs, and have not yet been replaced.

Tents, Vans, Sheds, &c.

In the early part of the year considerable trouble was experienced in enforcing cleanliness and preventing nuisances in connection with travelling gipsy-vans during their sojourn in the town. Some of these made the Market place a regular camping-ground and stayed on it for

months together. These structures have proved a source of trouble for many years, and an attempt was made to control them by means of a resolution which was passed some years ago to the effect that no tent, van, shed, or similar structure used for human habitation should be allowed to remain on the Market ground for more than one week without the sanction, in writing, of the Medical Officer of Health.

I endeavoured to carry this out but it soon proved futile for I had no power to send them away and when I refused to grant my sanction the then Market Inspector did not back up my action by refusing to continue their tenancy. I therefore left the resolution in abeyance, and served notice on two vans for over-crowding. Shortly afterwards I presented a report on the question to your Committee, and advised the framing of bye-laws under the Housing of the Working Classes Act, 1885, to promote cleanliness in and the habitable condition of these structures, for preventing the spread of infectious disease by the persons inhabiting them and generally for the prevention of nuisances. These were made, passed under the Corporate Common Seal on the 7th September, and confirmed by the Local Government Board on the 31st October.

Immediately before these bye-laws were passed—on August 14th—a case of Membranous Croup was notified in a travelling van. I at once visited the van, gave the usual instructions as to the prevention of infection and told the occupiers they were not to move the van from where it was until it had been disinfected. In spite of this and in spite of my having previously asked the police to keep an eye on the van it disappeared early in the morning a few days later and has never been heard of since. Such occurrences as this may explain otherwise mysterious outbreaks of disease.

Ice-Cream.

During the early part of the summer the several places in the Borough where ice-cream is made were visited and inspected. The largest of these is in Chetwode Street, and it is also the worst, being at the time of my visit in a most insanitary condition. It is under the management of an "alien immigrant" of Italian origin. The sink-pipe of the house delivered over an untrapped and dirty gulley situated in a wooden shed, in which the various receptacles were stored. The floor of this shed was loosely laid boards through which the washings

of the cans, etc., soaked into the ground beneath. There was a distance of about one yard between this shed and the opening of a covered privy-midden.

The other places were little "general" shops making only a small quantity of the material.

There appears to be a fair quantity of ice-cream sold in the streets, even in the depth of winter; the profit is probably greater at that season for the vendors do not trouble, as in summer, to send to Liverpool for their ice, but gather it—as I can testify of my own knowledge—from any handy frozen pool, which probably contains polluted water. The danger of this is evident, but the remedy is as yet non-existent; ice-cream not being an article of *food* within the meaning of the Public Health Acts.

Houses unfit for Human Habitation.

During the year eight houses have been certified by me to be unfit for human habitation, seven of these constituting the block known as Fareham's Row, and the remaining house being No. 2, Sydney Main Road. The tenants of Fareham's Row were cleared out by the owner on my request, and after a vast amount of correspondence, inspections, and interviews the houses were put into a fair condition. The closets have yet to receive attention, however. In the other case it was necessary to apply to the Magistrates for a closing order, which was granted, the owner consenting but the occupier being difficult to deal with. The house has now been closed, and repairs will shortly be commenced.

Filthy and Unwholesome Houses.

A large number of houses in the dirty parts of the town have been visited and notices issued for their cleansing. Most of these notices were at once attended to, but in the case of eight houses persuasion failed and it was necessary to prosecute. Immediately the summonses reached the owners of the houses, the work was put in hand, and when the cases came on for trial the summonses were withdrawn on payment of costs. The cost of the summons in most of the cases was about double the money which it would have been necessary to spend in doing the work. But as the owners concerned were stubborn and refused to do the little work necessary in spite of repeated warnings prosecution was the only thing left.

Poor Law Relief Statistics.

I am obliged to Mr. C. E. Speakman, Clerk to the Nantwich Board of Guardians, for the following information :—

1. Number of INDOOR-POOR relieved during Half-year ending Lady-day, 1899 :—

						Corresponding period of 1898.
Able-bodied	...	...	...	...	75	23
Not Able-bodied	...	...	...	...	405	402
Insane	...	...	...	...	20	22

Vagrants relieved during past year :—

						During 1897.
First Half	...	...	2,579	} 5,537	...	5,751
Second half	...	...	2,958			

- 2.—Number of OUT-DOOR POOR relieved in Borough of Crewe during half-year ended Lady-day, 1899 :—

		Men.	Women.	Children.		Corresponding period of 1898.
Able-bodied	...	35	...	137	} 371	181
Not Able-bodied	...	92	...	269		361
Insane	...	6	...	3		13
Total		...	...	913	Total	555
						(Excluding Children.)

Vagrants relieved during past year	...	...	806
“ “ “ 1898	...	...	830

- 3.—Cost of OUT-DOOR RELIEF for Borough of Crewe for the past year :

		£	s.	d.	1898.
Michaelmas Half-year	...	2068	14	2	
Lady-day “	...	1961	10	5	
Total		£4030	4	7	£4207 3 5

Expenses of Health Department.

Year ending March 25th	Estimated Expenditure.			Actual Expenditure.			Increase.			Decrease.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.
1893	1825	8	0	2302	18	2	477	10	2	...	...
1894	2200	0	0	2702	15	1	502	15	1	...	...
1895	2447	17	0	2476	3	0	28	6	0	...	...
*1896	2549	6	0	2388	1	7	...	...		161	4	3
*1897	2632	18	8	2599	18	6	...	...		33	7	2
*1898	2799	1	8	2826	0	11	26	19	3	...	...

* In these years *all* office expenses are charged to this account; in previous years a general "Establishment" account for all departments existed.

I regret to have to state that there has been an increase of expenditure over estimate of about £27. This has occurred in spite of the fact that a strict watch is kept month by month on the expenditure and that every item is carefully checked by myself personally.

Meterology.

Mr. George Latimer, the Curator of the Queen's Park, has very kindly furnished for the following Table.

1898.	Total rainfall in inches.	No. of Rainy Days.	Prevailing Wind, in Days.										Mean Temperature.				Mean Barom'tric Reading. (Uncorrected.)	
			N	S	E	W	NW	NE	SW	SE	Max'm in shade.	Mini'm in shade.	One foot deep.	Four feet deep.	9 a.m.	9 p.m.		
Jan. ...	2.99	9	..	15	...	6	2	...	5	3	45.2	35.0	43.0	45.0	...	...
Feb. ...	6.78	16	6	3	...	14	5	...	...	...	42.8	28.9	41.1	44.8	29.49	29.54
March...	3.12	12	6	1	3	6	11	...	1	3	46.1	27.9	39.4	42.6	29.51	29.51		
April ...	4.78	10	1	7	1	4	3	1	4	9	55.9	34.7	45.0	44.2	29.50	29.50		
May ...	5.96	19	3	2	5	8	9	2	2	...	58.6	38.9	49.8	47.6	29.47	29.48		
June ...	3.79	13	2	6	3	9	4	1	4	1	66.7	44.3	56.1	51.9	29.58	29.60		
July ...	1.53	7	3	...	2	11	12	1	1	1	69.6	46.9	59.6	55.9	29.81	29.82		
Aug. ...	5.67	15	...	5	12	1	6	...	4	3	71.0	49.0	63.0	58.0	29.63	29.62		
Sept. ...	1.59	4	...	5	3	7	2	1	3	9	68.3	45.2	58.9	58.4	29.76	29.75		
Oct. ...	5.50	16	...	6	13	2	...	2	2	6	57.2	43.7	53.0	55.0	29.43	29.41		
Nov. ...	4.34	10	1	9	3	4	4	...	1	8	50.3	37.9	47.5	51.9	29.43	29.43		
Dec. ...	5.95	17	...	9	...	7	6	...	6	3	57.0	47.8	45.0	48.2	29.54	29.54		
Total ...	52.00	148	22	68	45	79	64	8	33	46	...	...	...	...	...	...

TABLE OF POPULATION, BIRTHS, AND OF NEW CASES OF INFECTIOUS SICKNESS coming to the knowledge of the Medical Officer of Health, during the year 1898, in the Borough of Crewe; classified according to Diseases, Ages, and Localities.

Names of Localities adopted for the purpose of these Statistics; Public Institutions being shown as separate localities.	Population at all Ages.		Registered Births.	New cases of sickness in each locality, coming to the knowledge of the Medical Officer of Health.								Number of such cases removed from their homes in the several localities for treatment in Isolation Hospital.			
	Census 1891	Estimated to middle of 1898.		Aged under 5 or over 5.	Small-pox.	Scarlatina.	Diphtheria.	Membranous Croup.	Fevers.			Small-pox.	Scarlatina.	Typhus.	Enteric or Typhoid.
(a)	(b)	(c)	(d)	(e)					Typhus.	Enteric or Typhoid.	Puerperal.	Krysipelas.			
CENTRAL WARD	10,680	...	Under 5... 5 upwards	...	6 6	...	2 ...	...	...	...	...	5 4	...	...
WEST WARD	9,520	...	Under 5... 5 upwards	1	3 7	1 1	1 ...	...	...	...	1 10	3 6	...	...
NORTH WARD (H)	10,105	...	Under 5... 5 upwards	...	5 6	...	1 ...	...	...	...	1 13	4 3	...	...
SOUTH WARD	10,605	...	Under 5... 5 upwards	...	7 17	2 6	...	...	...	...	1 13	2 10	...	...
ISOLATION HOSPITAL	Under 5... 5 upwards	...	...	...	...	1	...	...	...	...	...	...
TOTALS ...	32,753	40,910	1365	Under 5... 5 upwards	1	21 36	3 33	4 ...	...	1 31	...	3 46	14 23	1 1	...

“ Notification of Infectious Disease ” compulsory in the District since October 1st, 1896.
Isolation Hospital for Scarlet and Typhoid Fevers situated in North Ward (marked H).

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SPECIAL REPORT

ON THE

REMOVAL AND DISPOSAL OF HOUSE REFUSE,

AND THE

CHARACTER OF THE CLOSET ACCOMMODATION

IN THE

BOROUGH OF CREWE.

MEREDITH YOUNG, M.D., D.P.H.,

MEDICAL OFFICER OF HEALTH.

MAY, 1899.

HEALTH DEPARTMENT,
MUNICIPAL OFFICES,
CREWE, APRIL, 1899.

REPORT ON REMOVAL AND DISPOSAL OF HOUSE
REFUSE.

*To the Chairman and Members of the Health Committee
of the Crewe Town Council.*

Gentlemen,

No better text can be found for this Report than Section 40 of the Public Health Act, 1875, which reads as follows—

“Every Local Authority shall provide that all drains, water closets, earth closets, privies, ashpits, and cesspools, within their district be *constructed and kept* so as not to be a nuisance or injurious to health.” In Lunley’s Public Health Acts this Section is followed by a note—

“Here a duty is imposed upon the Local Authority which requires much earnest consideration.”

I propose to put before your Committee in the following pages, a statement of the existing sanitary condition of the town under your charge in the matter of the collection and disposal of refuse and of closet accommodation.

You will see from the Report that the existing state of matters is one which is not only dangerous, but can be proved in certain cases to have been actually injurious to the health of the town. Not only will the evil grow as the town grows, but the expense of remedying it will likewise increase. Therefore, I advise you to grapple with the problem without any loss of time.

You are entrusted not only with the money of the ratepayers, but with their lives, and the lives of their children, and it is in the highest degree necessary, after a careful consideration of this report, that you should adopt a firm, thorough and advanced sanitary policy.

I am, Mr. Chairman and Gentlemen,

Yours faithfully,

MEREDITH YOUNG.

Report on the Removal and Disposal of Refuse in the Borough of Crewe.

Under Section 42 of the Public Health Act, 1875, the Local Authority may undertake, or contract for,

1. The removal of house refuse from premises.
2. The cleansing of earth closets, privies, ashpits, and cesspools.

By Section 45 of the same Act where the Local Authority undertake this removal or cleansing they are bound to do such work within seven days from the receipt of a notice, in writing, from the occupier, otherwise they are subject to a penalty of five shillings per day during default.

I propose to deal with the removal of dry ashes first, and then to go into the more difficult problem of closet accommodation.

PART I.

Under this first heading I propose merely to describe briefly the systems upon which house refuse is usually collected, and to offer a few suggestions which, if carried out, will facilitate the work and lighten the expense of the Sanitary Department.

The quantity of refuse per head per annum is a very variable factor. Here, on the average, each house produces $1\frac{1}{2}$ tons or 60 cubic feet of dry refuse per annum. In London the quantity of house refuse alone is equivalent to from 4 to 5 cwt. per head per annum. In Leyton, a town of about 90,000 inhabitants and in which pail closets are largely in use, the amount of house refuse is equal to about $2\frac{1}{2}$ cwt. per head per annum.

A most important truth which is but little appreciated on account of its paradoxical nature is that the amount of house refuse is largely governed by the size of the receptacle into which it has to be put. If two houses be taken of the same size and in every respect equal, except that one has a large fixed ashpit and the other a small moveable dust-bin, it will be found that one week's accumulation of ordinary house refuse in the former case will often be more than double that in the second case. This is a fact that all who have any practical experience in scavenging can verify. The explanation is simply that when a large receptacle is provided it is used for the deposit of anything and everything which is useless, whereas when the receptacle is only large

enough for its primary purpose, namely, dry ashes and unconsumable waste, it is reserved for that purpose alone, and some other outlet is found for the other rubbish.

According to Mr. Codrington a cubic yard of ordinary house refuse weighs from 12 to 15 cwt. but may be lighter sometimes weighing as little as 7 cwt. A load is generally taken as being equivalent to one cubic yard. In this town the carts are larger than the average and contain about two cubic yards, or a weight of $1\frac{1}{4}$ to $1\frac{1}{2}$ tons as tested by actual experiment.

Each dust-bin as provided here is of a capacity of about four cubic feet. In round numbers we collect every year about 10,000 tons of dry household ashes and refuse.

The work is therefore a fairly large one and involves a cost of about £1,000 per annum in horse hire and men's wages alone. I am consequently anxious to have it worked on such lines as will keep this expenditure down. I am convinced that in scavenging, as in most other things, systematic work is cheapest. But not only that it also results in improved health conditions. Take the following example in proof.

In 1892, as reported by Dr. J. Spottiswode Cameron, the Leeds Sanitary Authority determined to see whether special means would reduce the great mortality from Diarrhœa in that city. It was accordingly resolved in one district with a population of nearly 34,000 and comprising about a tenth of the town, to pay special attention to the scavenging or refuse removal. The result was remarkable. Though the death rate from Diarrhœa in the city as a whole *increased* to 5.19 per thousand as compared with 3.42 for the preceding year, the death rate in this specially scavenged district actually *decreased*.

I need not enlarge further upon this part of the question.

Systems of Refuse Collection.

The collection of house refuse may be done according to any one of several methods, or according to a combination of methods.

1. COLLECTION UPON RECEIPT OF NOTICE from the occupier is very seldom adhered to alone, there being almost always a periodical collection street by street in addition. This is the system which together with the house to house system is more or less followed out in Crewe.

It is of primary importance in the scavenging of a district on this system to have a *movable* receptacle of a fairly uniform pattern and of a capacity not greater than six cubic feet. The receptacles should preferably be covered, so as to keep out rain, and the covers should be such as can be entirely removed by the scavenger. Covers which are hinged or fastened in any way to the receptacle are liable to be damaged during emptying.

The dust-bins should be marked with the initials of the owner or the number of the house, so as to prevent confusion and unjust accusations against the workmen employed in scavenging. A plan often adopted for galvanised-iron receptacles is to punch holes through the sides of the receptacles near the bottom in such a way as to form initials or a number. This serves a double purpose inasmuch as it tends indirectly to prevent any wetness of the contents of the bin. Careless people will throw slop-water into dust-bins if such a precaution is not taken, but they soon desist if they find that the slop-water soon re-appears and trickles over the surface of the yard. The precaution is scarcely, however, to be recommended, for several reasons—an important contra-indication being that it shortens the life of the dust-bin.

2. THE HOUSE TO HOUSE SYSTEM—where the cart calls at each house at short intervals, weekly or fortnightly, or when a special card with a large letter “D” is exhibited in the window. The latter mode of carrying out this system has the great disadvantage that time is frequently lost by the carts travelling from house to house.

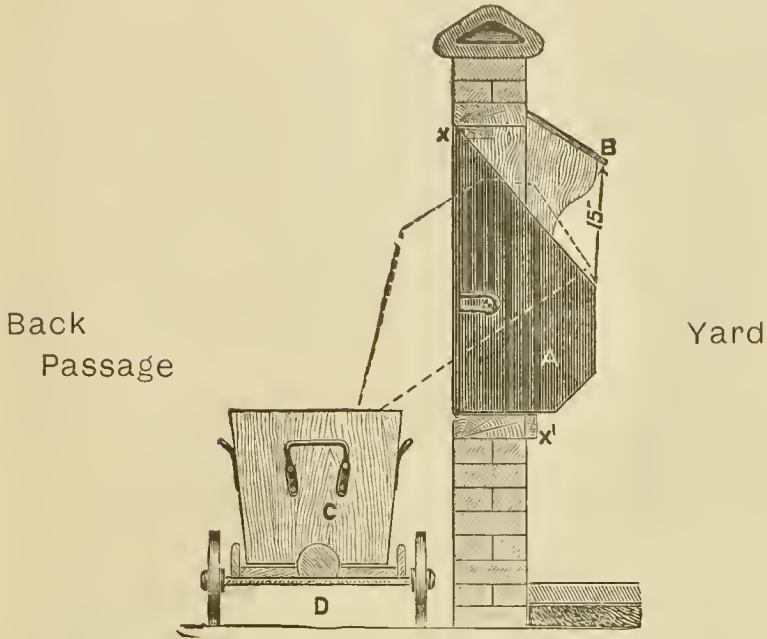
The former system is the one principally in use here, the houses being visited fortnightly. It is a noticeable and undeniable fact that as this system has become more generally established here, the cost of the work has decreased. Every endeavour is therefore being made by the Department to extend it.

3. DR. QUINE'S SYSTEM of scavenging is one which offers many advantages over the ordinary moveable dust-bin. It is sufficiently explained by the accompanying illustration. Its main advantages are :

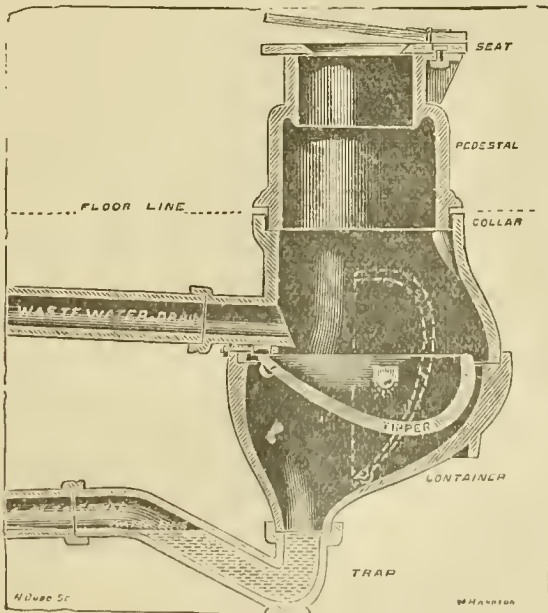
1. The scavengers need never enter the yard and much time is thus saved.

2. One man can do the emptying in a few *seconds* ; if the bin is used with a trolley, four or five bins can be emptied in *one minute* with

DR. QUINE'S PATENT DUSTBIN.

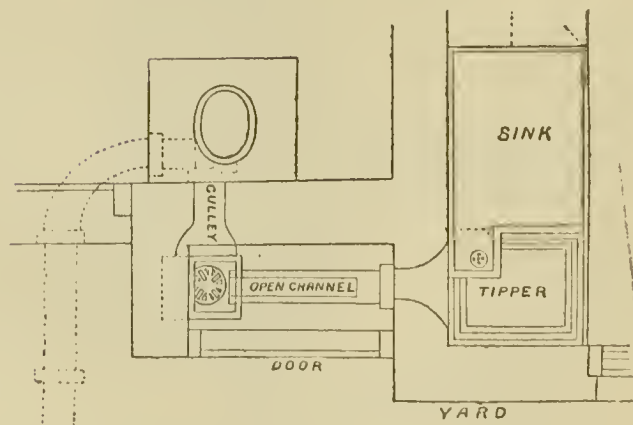
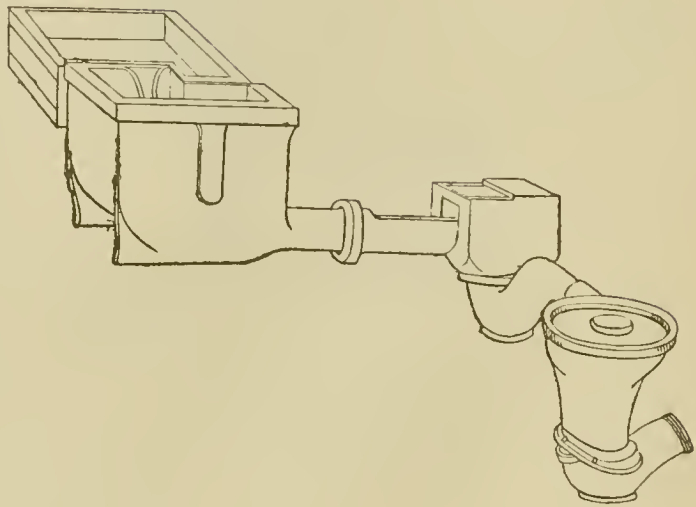


- A.—Galvanized iron tipper to contain ashes.
 B.—Cover to protect contents from rain.
 C.—Galvanized iron box or trolley.
 D.—Trolley. X.—Self-fastening catch opened from inside.
 X¹.—Wooden frame.



DAY'S STAFFORD WASTE-WATER CLOSET.

²⁰
~~F~~IBBLE'S PATENT (TOP-FLUSH) WASTE-
WATER CLOSET.



this, and then taken up to the cart. With an ordinary bin *two men* are usually needed to take the bin out and empty it and *then to bring it back again*. In a test made January 4th, 1899, at Oldham, the bins of 15 houses on this system were emptied into the cart in 315 seconds, or an average of 21 seconds per house. In a second test made January 13th, 1899, the same bins were emptied in 280 seconds, or an average of $18\frac{1}{2}$ seconds per house—in spite of two slight delays. In each case only one man was employed to do the emptying: the driver remained by his cart. There is no system known which can approach this for expediency let alone its other advantages.

3. There is no rolling of dust-bins along footpaths and passages to be done, thereby causing injury to both bin and pavement.

4. Children cannot reach it to play with the contents.

5. Its wear and tear is extremely little, its life being estimated at 15 years.

6. It takes up no room in the yard.

The bin has been, and is still being largely used in Manchester, Salford, Burnley, Leeds, Hanley, Stafford, Birmingham, Bury, Oldham, Eccles, Holyhead, Middleton, St. Helens, and a number of other large towns.

Its cost together with wooden framework is 28s.; without framework £1 1s. 6d. The trolley would cost about £2 10s. 0d., and the galvanised iron boxes for trolley about 10s. each. Instead of a trolley a large light "skep" or wicker basket lined with tarpaulin and costing about 8s. 6d. has been used satisfactorily.

4. DAILY REMOVAL. Where this system is adopted the refuse is deposited in suitable receptacles and placed either in the forecourt of the premises or on the street kerb, and is removed in the early hours of the morning by the Sanitary Department's carts. Sanitary Authorities who undertake this system generally find it best to provide the receptacles themselves, or prescribe in bye-laws a standard kind of receptacle, for if this be not done all kinds of unsuitable boxes, etc., are used. Bye-laws must also be made providing for the placing of the receptacle on the kerb or elsewhere at a certain hour every day. This system is undoubtedly the most sanitary of any.

The theoretical difficulty sometimes urged against it that the householder will object to carrying out this duty daily, or on the other

hand, will object to the scavenger coming on to his premises every day, does not exist at all in actual practice.

It is of course only in fairly large urban districts or in places where the houses are concentrated that this plan can be economically worked. The business portion of the Borough might be scavenged with considerable advantage and also with considerable saving to the Sanitary Department in this manner.

It is noteworthy that the total amount of refuse collected on this system is considerably less than upon the fixed dry ashpit system and that "there is not the same temptation to the scavengers to waste time in sorting out the refuse, conversing with servants and others, and lingering about in the hope of receiving gratuities in any form." (W. H. Maxwell, *Sanitary Record*, October 27th, 1897.)

As to it being a less expensive method, one might point to the experience of Leyton, an urban district with about 90,000 inhabitants. In this town the cost of collection and disposal on the fixed ashpit system was 2s. 9d. per head per annum. The first year that the daily removal was adopted the cost fell to about 1s. 8d. per head per annum, or almost to half of the original cost.

It would not only be a sanitary but also an economical gain if a daily system of collection in the business portion of the town could be tried.

My predecessor, Dr. Herbert Jones, attempted to inaugurate it and commenced negotiations with the Tradesmen's Association with a view of securing their co-operation, but for some reason the matter fell through. I feel sure it is worth while trying it for a few months at least and the coming summer would offer a good opportunity of testing its sanitary advantages in particular.

5. In the poorer and more crowded parts of a densely populated town, the provision of *public dust-bins* has often proved a very useful system. The Sanitary Authority provide these dust-bins and clear them at intervals. They can be placed in positions so as to be readily accessible to the scavenging carts. There are some objections to their use. In the first place they are used in common by a number of houses, and responsibility being thus divided, it is difficult when a case of complaint arises to fix upon the author. Complaints are sometimes

made by persons occupying houses in close proximity to them, that the door of the dust-bin is continually left open, and that round about the dust-bin the refuse is spilt, giving rise to a dirty and untidy appearance. It is somewhat difficult to remedy these complaints. Self-closing doors have been tried for the first, but like all mechanical contrivances they require attention in order to prevent them going wrong. The second difficulty may be met to some extent by the enforcement of Section 21 of the Public Health Acts (Amendment) Act, 1890.

The advantages, however, outweigh the disadvantages considerably, and I think if in a few places in the town your Council were to obtain the consent of the owners to do away with some half-dozen ashpits and erect one common ashpit in their place—which could be scavenged daily—the health benefits would be worth the outlay, and the cost of scavenging would be reduced. Localities like Whitegates, Cross Street, Bowling Green, Wrexham Terrace, many of the streets off West Street, Fareham's Row, etc., present a suitable field for experiment in this respect.

Suggestions with regard to Fixed Ashpits.

The fixed dry ashpit as at present constructed is difficult to scavenge for two reasons—one that the floor is a few feet below ground level, and the contents are therefore frequently wet and heavy, and the other that the front part of the ashpit is bricked up. The men have to stand in the inside of the ashpit and shovel the refuse out into a barrow—a tedious and offensive process. This difficulty could be very simply avoided, without the provision of a moveable dust-bin, by firstly filling up the ashpit to about three inches above ground level to prevent access of water, and, secondly, by having a stout door made to open to form the front of the ashpit in place of the brick wall. The scavenger would then merely have to open the door and shovel out the contents; he would now have room to use his spade freely and the work would be done in a third of the time.

Removal of Trade Refuse.

I am decidedly of opinion that the time has come for your Council to carry out what is not merely a right but a duty under the Public Health Act of 1875, namely, to make some small charge to tradespeople for the removal of the refuse generated by their business.

At present fishmongers, butchers, and others, are called upon to

remove their offal and special trade refuse to the farm for disposal, and yet other tradespeople, who produce in some cases ten times the bulk of refuse, are allowed to have it removed free of all cost by the Corporation.

The average trade refuse is composed of material which is light and thus makes a large number of loads; it is useless for anything except tipping to waste in the sandhole at the farm, and it is greater in bulk and causes more cost in scavenging than that of several dwelling houses put together.

It is argued that inasmuch as shop property usually pays high rates, therefore, shop-keepers are entitled to have their special refuse removed without any further charge.

Those who put forward this argument would almost have us think that the rates paid are for removal of refuse and nothing else. They forget that it is principally those who have no shops who pay for the removal of the refuse from shops.

The average house in Crewe has a rateable value of £10 and the average shop of £20; the former pays for the removal of dry refuse (which costs roughly speaking the equivalent of a twopenny rate) a sum of 1s. 8d. per annum; the latter paying twice that amount or 3s. 4d. per annum. The question now comes for the removal of how much refuse will the 3s. 4d. of the shop-keeper pay? Roughly speaking one load and a third. Yet we remove on an average from trade premises in the town *more than treble that amount*.

The above figures are, however, too lenient towards the shop-keeper, for very many of the shops are occupied together with dwelling houses and the refuse is all mixed up together. Thus all that such a shop-keeper would pay towards the removal of his trade refuse would be about 1s. 6d. a year, and that would not cover half the actual cost to the Health Department.

When the question came before your Committee some little time ago, it was stated that there would be a difficulty in defining what was trade refuse. Theoretically there may be a platform from which those who wish may talk, but practically there is not the slightest difficulty in the matter, and the intelligence of an ordinary scavenger is usually sufficient to discriminate the one kind of refuse from the other. There certainly have been cases taken to Court on this point, but judgment

has invariably been given on commonsense lines and in a manner which warrants the statement made in the preceding sentence.

Your Committee is at present establishing what, in my opinion, is a distinctly bad precedent, and you should, I think, in fairness to the rate-payers as a whole ask the producers of trade refuse to at least contribute something towards the cost of its removal.

If in your opinion the charging of the actual cost of removal, or 3s. per load would be too much a charge at the rate of 1s. 6d. per load would not impose any hardship on any tradesman however large or small, whilst in the case of business premises occupied jointly with dwelling houses this charge might be reduced to 1s. per load. Even if a merely nominal charge were made I think it would be wisdom to impose it, if for nothing else than to demonstrate and maintain your right to charge.

The advantage gained would not be so much in the amount of money received, for at the above rates it would not probably exceed £100 a year; but the imposition of a charge would, I am confident, have the effect of lessening the amount of trade refuse produced.

If at any time a destructor is provided, tradesmen might be given the opportunity of sending their refuse there for destruction at stated hours. Many who have carts would doubtless avail themselves of this method, and of course they would thus avoid the payment of any charge to the Corporation.

RECOMMENDATIONS.

As *recommendations* for your consideration on this part of the Report, I would offer the following:—

1. That the construction of fixed ashpits be not encouraged, but that in their place moveable receptacles be required as far as possible. That effect be given to the suggestions in regard to the construction of fixed ashpits by having a printed slip containing the suggestion attached to any plan for a new building on which a fixed ashpit is shewn.

2. Dr. Quine's system offers very many advantages over the moveable receptacle, and in my opinion is well worthy of extended use. If your Committee desire, I will purchase a couple of the collecting baskets, and endeavour to persuade some property owner to try the bins, after which I will report to your Committee, and you may then sanction it or not for use in the Borough.

3. That a daily system of refuse collection from the business premises in the following streets be commenced and tried for, say six months:—West Street, Hightown, Victoria Street, Market Street, High Street, Exchange Street, Mill Street, Nantwich Road, and Earle Street.

4. That bye-laws be framed so as to facilitate this daily collection of refuse. In the Appendix to the Report will be found a model series of such bye-laws.

5. That some charge be made to tradespeople for the removal of refuse from business premises.

Part II.—The Closet Accommodation of the Town.

From the following notes your Committee will see what is the existing condition of the town in the matter of closet accommodation.

I have appended a short list of places under each heading where the various types may be seen, and I trust that some of the Members of the Committee will for their own personal information inspect a few of these. I feel sure that it is only some such thing as that which will impress upon the Committee the magnitude of the existing evils.

1.—CESSPOOL PRIVIES. I regret to say there are still many of these in the town—over 200 at least.

In structure they consist of a small hole in the ground 2 or 3 feet square lined with rough brickwork, the hole being covered with a flag (which is more often broken than not), or by rough boarding. This hole in the ground is connected by a kind of shoot with the privy, but the ashes of course do not gain admission. The contents soak readily into the ground and after rain the cesspools frequently overflow and run over the yard or the passage in which they are placed.

These are undoubtedly the foulest receptacles it is possible to have in connection with a house and have not a single redeeming point. Even in what we might term the slums of the town the tenants complain strongly about them and with just cause.

Types of this class of privy may be seen in any of the following streets:—Queen Street, Oxford Street, Rigg Street, Herdman Street (at corner of Railway Street), West Street (at junction of Oxford Street), Henry Street (west end, opposite Chapel), Cemetery Road (top end, west side), Thomas Street (about middle), Lockitt Street (near Gas Works), &c., &c.

2.—FIXED RECEPTACLES. Second only to cesspool privies in their nuisance-producing qualities are fixed receptacles. These are bricked compartments lined with cement, filling the whole of the space under the privy-seat. They receive only excreta and urine, and contain about one month's supply. The cement, especially at the junction of the bottom and the sides, is frequently cracked and allows free leakage into the subsoil. Leakage also often takes place into the privy itself or into some yard or passage adjoining. These receptacles have to be emptied by means of ladles through the seat-opening into buckets which are carried through passages or yards to the carts—a tedious, expensive, and filthy process. I can only say that these are most objectionable from every point of view, and should one and all be abolished at the earliest possible moment. There are about 60 existing in the town at present and types may be seen in any of the following streets:—Elizabeth Street, West Street (opposite St. Barnabas' Church), Wistaston Road (near Brewery), Mill Street (about middle on both sides), Gresty Road (west side, near Bedford Street), &c., &c.

3.—THE PRIVY-MIDDEN, OR MIXEN as it is termed here, consists merely of a hole in the ground lined with rough brickwork, thinly cemented over, and receiving excreta, urine, ashes, household garbage, and occasionally slop-water. It is generally constructed of such a size as to contain from three to six months' supply of these matters. Many "mixens" are uncovered (about 1,000 such existing in the town at present) and are thus open to the access of rain and sunlight, a condition eminently favourable to putrefaction. Others are covered, but, as in a large number of cases the tiles are laid about half-an-inch apart in order to ventilate the mixen, the rain-water can to a certain extent gain access. Both the covered and uncovered "mixens," however, receive urine and excreta and, therefore, although they may appear dry on the surface, below this their contents are always wet and offensive. In addition to this, in almost all cases the "mixen" is from two to six feet deep below ground level and therefore ground water leaks in. I have frequently watched the complete emptying of a covered "mixen" and, although the top portion of their contents might be perfectly dry and appear inoffensive, the bottom portion turned out to be a black, seething, stinking sludge, which had to be carried in pails to the cart. The character of a "mixen" must always, therefore, be judged principally from the condition of the bottom portion. There

appears to be a notion that ashes will absorb any amount of liquid excrementitious matter, but this is altogether erroneous. Even were a perfect admixture of ashes and excreta to take place (and I have never seen a privy-midden in which it did take place) the average quantity of ashes from a household would not be sufficient to absorb the liquid excreta. When we add to this fact the further fact that bedroom and other slop-water is extremely frequently thrown into ashpits in spite of repeated notices and cautions the state of the contents of these "mixens" can be readily imagined.

Leakages from even well-constructed privy-middens are matters of every day occurrence, and owners of property are continually being called upon to chip and cement the interiors, renew or point the brick-work, etc. Times without number the same tale repeats itself—the new cement breaks off, a fresh nuisance arises, a fresh notice is served, and the patience of both owner and officials is taxed to its utmost. But the mischief is by no means repaired when the midden is repaired—the ground is already saturated with polluting matter, which will take four or five years to become innocuous, and possibly all this time will be providing food for the germs of specific disease, which may lie dormant for years.

It does not appear to be realised by many Members of the Committee that the mere fact of an ashpit being 'uncovered' is an offence against the Public Health Act, 1875, which provides that every house shall have an ashpit "furnished with proper doors and coverings."

Dr. Vernon, of Southport, has pointed out a disadvantage of the privy-midden system which has been found by experience to be of a serious nature, viz., that in mixens, covered or uncovered, but more particularly of course in the latter, the contents are invariably wet, and in consequence of this, heavier; the difficulty and expense of cartage is in this way greatly augmented. Heavily built and watertight carts have to be used and smaller loads have to be taken. Where the contents can be kept dry as for example in the case of dust-bins or dry ashpits unconnected with privies, the cost of cartage is considerably less.

It is urged by the advocates of the mixen system that dryness of the contents of such a receptacle can be ensured by the provision of a drain to the ashpit. I need scarcely point out that such an arrange-

ment is absolutely prohibited by Bye-law No. 84 (New Streets and Buildings). Indeed the result of any provision of means of drainage will be to *suggest* that the privy receptacle may be used for slop-water, etc., thus defeating the end held in view, viz., to secure the utmost possible dryness of contents. Besides this the drainage of privy-middens or ashpits has been almost invariably found to choke the drains and the sewers with which they may be connected; a most offensive material often accumulates, and this causes both nuisance and injury to health, not only to persons using the ashpit, but also to persons living in dwellings with which such drains and sewers are connected. An examination in Manchester of seven sewers with which drains from privy-middens were connected led to the discovery that they "were to a great extent blocked with a mass consisting of small coal, ashes, bits of broken pot and fæcal matter, cemented by the latter into a strong mortar." (Knight's Annotated Model Bye-laws, p. 164.)

Dr. Crocker, of Eccles, writing in the *Sanitary Record* (July 26th, 1895), states that in most cases where the main drains were stopped it was due to fine ashes which had been carried in from drained privy-middens.

In a few parts of the town, for example, Alton Street, what is known as the *Nottingham ashpit* is to be found. This is, if anything, a very slight advance on the average mixen. It consists of a central ashpit with a sunk hollowed-out floor rendered in cement; opening into this on each side are privies. The average capacity varies from 60 to 80 cubic feet, and the receptacle requires emptying about once every three months. The ashpit is usually ventilated through the openings in the privy seats. The ashes are very imperfectly mixed with the excreta, and, of course, most of the objections to the mixen system apply with equal force to this particular type. There are about 1,500 uncovered and 320 covered privy-middens in the town at present. Types may be seen in the following streets:—Broom Street, (north side), Thomas Street (middle), Peel Street (west side), Dorfold Street, Betley Street, Tollitt Street, Oak Street (middle), Nantwich Road (south side, east end), &c., &c.

4.—The PRIVY PAIL or the pail system of refuse removal has been described by Sir Robert Rawlinson as "a filthy, stinking abomination," and this remark was uttered, I believe, in reference to the Rochdale

system in particular. The Rochdale pail system is worked in a more perfect manner than any other in the country, with the exception perhaps of the Halifax or Goux system. Every pail after being emptied is thoroughly washed out by a hose delivering water under a strong pressure, and half-a-pint of disinfecting fluid is put into each pail afterwards. The pails too are made of oak and are provided with an air-tight lid to prevent a nuisance during removal. In spite of these precautions the system is described as "a filthy, stinking, abomination." What shall be said of the pail system as carried out in this town where the pails are never cleansed throughout the whole period of their use, and are only "disinfected" (if "disinfection" it may be called by any stretch of imagination) by having a little carbolic powder dusted into them after they are emptied?

The system of removal of these pails as here carried out, meets with universal popular condemnation as an intolerable nuisance. But there are circumstances which render the pail system in this town a menace to the public health. The pail privies are frequently placed on porous ground, instead of on impervious material. Between the top of the pail and the under surface of the seat there is always a distance of three or four inches, and frequently a distance of eight or ten inches. As only in extremely few cases are urine-guides provided, and as the night men cannot always ensure the replacing of the pail exactly beneath the opening in the seat, there is a liability to the pollution of the soil round about these pails. It has been my experience in hundreds of instances to find that the ground round about a privy pail was a mass of soft sludge soaked with excrementitious matter. There is a danger too, in cases where the pail is very full, of some of the contents being spilled on the surrounding ground during emptying. Pollution of the soil may also be caused of course by leakage from these pails, corrosion of the galvanised iron taking place. In some parts of the town, for example Middlewich Street, a kind of oblong wooden trough is used instead of a pail, the wood being unprotected by paint or tar, etc., either inside or outside. The sloping sides and the very frequent absence of proper handles render the emptying of these without pollution of the soil a matter practically impossible. The wood absorbs excrementitious matter and becomes fouler every day. In addition to this, of course, these receptacles labour under all the disadvantages of the pail system.

It is frequently argued that if the scavengers were careful in their work much of this pollution of the soil would not take place, but in answer to this, it may be stated that their work has to be done in the night time, when supervision is difficult, that the pails have to be sometimes carried a considerable distance along narrow passages, that the floor on which the pail rests is frequently uneven, the opening through which the pails have to be drawn is small, and that it is impossible under these conditions, and with the men who do this class of work, to ensure such a degree of carefulness as one might otherwise obtain.

There was in Brighouse a very great difficulty in disposing of the pail contents after collection, and, as I can testify, there were numerous complaints, especially in closely populated places, of the nuisance caused by the smell from the pails whilst in the closets. In spite of the fact that the pails were fitted with air-tight lids there were also constant and numerous complaints of the smells from the vans as they passed through the streets.

Where wooden pails are used the wood, as has been stated, absorbs the liquid filth. In Nottingham, one of the ordinary oak pails was found to have increased in weight from 27 lbs. to 44 lbs. in nine months, owing to this absorption of faecal matter.

The cost of dealing with pail closets is difficult to estimate for this town, as the pails are scavenged along with mixens, cesspool-privies, and fixed receptacles. At St. Helens the expenditure has been estimated as equal at least to 2.368 pence per pail per week, or about 10s. per annum. The cost is very little less in Crewe. Now, a person renting a house rated at £10 pays for the *whole* of the scavenging of his house (pail and ashpit refuse both) about 5s. per annum, or about 3s. 4d. for the scavenging of his pail-closet and 1s. 8d. for his dustbin. *He thus pays less than half the cost, and the people who have larger houses with water closets where no pail scavenging is necessary pay the balance for him.*

In Huddersfield, where the pail system is largely in force, and where there were about 14,500 such receptacles, the total annual cost of collection and disposal amounts to about £4,850, or 6s. 8½d. per tub. If we deduct from this sum the ground rent, rent of depot, rates and taxes, and repairs to sheds, the cost is reduced to 5s. 9½d. per tub.

In Brighthouse the average cost of the pail system, worked so far as collection is concerned on practically the same lines as the Rochdale system, was 7s. 6d. per pail per annum. The number of pails in this town is about 2,500. In a portion of this Borough where the houses were more scattered the cost was about 9s. 6d. per pail per annum.

I have heard it suggested that the cost of scavenging where the pail system is in force might be reduced by the provision of larger receptacles, so that the pail would only need removing once every fortnight. Apart from the nuisance and the serious danger to health which would be inevitable under such a system, it would be *utterly impracticable* for the scavengers to remove and empty these. They would very rarely be able to lift them. The suggestion, therefore, is absolutely valueless.

The pail system of this town if it were to be worked on lines similar to those existing in the town last named would have to be entirely re-modelled. In the first place arrangements would have to be made for providing about 100 duplicate pails, in order that when the full pail was taken away a clean empty one might be left in its place. The pail itself would have to be provided with an air and water-tight lid. The pails cost about 5s. and the lids 12s. 6d. each. A special set of vans would be necessary for the conveyance of these pails. A depot would be necessary at the Farm, or elsewhere, where the pails could be emptied, washed, and disinfected. All these things would necessitate a heavy initial outlay and an expensive staff to maintain them. Moreover, it would be practically impossible to work the system unless the Corporation themselves provided pails of a standard make and sold them out to the property owners.

I cannot, therefore, recommend the amendment of our pail system on these lines. I have, however, a method of dealing with them, which I can recommend with a fair degree of confidence.

A short time ago, through the courtesy of Mr. Randal Burslam, Surveyor of Congleton, I was enabled to see the "Congleton Peat System" of nightsoil collection and disposal in actual work. In this system wooden pails or tubs each containing about 7 lbs. of dry disintegrated peat acidulated with about 8 per cent of sulphuric acid are used for the reception of urine and excreta.

There are in Congleton 1,100 such pails, and these are scavenged

by three men working only in the day-time. The collecting van contains 28 pails, but by emptying the contents of one pail into another the scavengers bring back with them on their return journey the contents of 65 pails on an average; the van makes three journeys per day.

Congleton has the advantage of being in close proximity to a peat moss from which it can obtain its peat supply very easily. But recently, owing to the season's supply not being sufficient, ordinary peat moss litter—which is put through the disintegrator—has been used with every satisfaction. The peat sods as they come from the moss are first chopped with an ordinary hay-chopper (used without the weights) and the chopped moss is fed by hand into a No. 2 Carter's disintegrator, being carried away from this along a worm and deposited in sacks. The power for grinding is obtained from the steam road roller, about 15 to 20 H.P. being required to work the size of disintegrator named. Two men can grind as much peat in one day as will last a week. The machine running at about 2,000 revolutions per minute stirs up a large amount of air and dust, the latter being collected in a large balloon-shaped bag connected by means of a wooden shaft with the disintegrator.

When a van full of pails comes in the pail contents are tipped out into a large manure shed by two men whilst a third quickly washes the pails out, scoops up in a large measure the requisite amount of acidulated peat and deposits this in the pail, which is then put back in the van. The same water is used for washing all the pails of one van and it is finally emptied into a tub-cart and sold as manure liquor to farmers.

I visited the dépôt and manure-shed before the van came in, I stayed there whilst a van-load of pails was being dealt with, and I examined closely a number of pails before they were washed, but the smell was so slight in all cases as only to be perceptible on close application. I examined the complaint book, I inquired if complaints had ever been received about the passage of the carts through the streets in the day-time, I asked people who used the system and I went to inspect pails in actual use, but in vain. In short, I went to see the system as a somewhat suspicious critic. I came away perfectly satisfied that I had at last found a remedy for the abominable pail system, which we have in our own town, and I have no hesitation, therefore,

in recommending it to the attention of your Council. As an instance of the inoffensive nature of this type of closet, I may mention that one is at present in use *inside* the Technical School at Congleton.

The *cost of the installation* at Congleton, was as follows:—

Cost of Disintegrator	£25	0	0
Cost of Worm, Shafting, etc.	£25	0	0
Total	£50	0	0

The *cost of working*, as shewn by the accounts for the year ended March 31st, 1898:—

Cost of emptying, etc.	£214	9	2	
Cost of Peat and Acid	£162	9	8	£162 9 8
				£376 18 10
By Sale of Peat Manure	£122	1	11	
Deduct value of Stock of Peat in hand	£15	0	0	£137 1 11
				£137 1 11 Less £25 7 9

The cost of emptying, though it is I believe greater in our system than in the Congleton system, may be taken as equal in both cases, so that the sanitary management of 1,100 pails is secured for a sum of about £25 per annum. Granting similar conditions the above figures if doubled throughout may be taken as roughly applicable to Crewe, where we have about 2,600 pail closets.

The manure at Congleton is sold to farmers at 6s. or 7s. per ton according to season, and frequently the Authorities are unable to meet the demand for it. About 50 cwt. of manure per acre is recommended as a dressing.

In the application of the system to Crewe it would not be practicable to use sulphuric acid with the peat for this would, of course, corrode the galvanised iron pails. The peat would, however, be a sufficient deodorant without this, and if it were feared that people would abstract the peat for garden use it would be an easy matter to add some disinfectant to it. No difficulty of this nature has arisen at Congleton.

One very great advantage which would accrue if the system were adopted here would be that most of the work which has now to be

done in the night could be done in the day, and would then be less expensive, more quickly done, and better under supervision. The abominable smells which are distributed throughout the whole town from ten o'clock at night till six o'clock in the morning would be practically abolished. All that I should ask your Council to do at present would be to add to each pail scavenged about 4 lbs. of powered peat; this, I think, would be enough for the size of pail used here. The men would empty the pail contents into a cart (which might be of much lighter build and, therefore, less expensive than those now used) wipe the pail round with a handful of peat dust, throw in the peat dust, and replace the pail.

For 2,600 pails we should require about four tons of peat moss per week. This could be obtained at a cost of about 28s. per ton, carriage paid to Crewe. The four tons of peat moss per week would, when mixed with excreta and urine, make about 24 tons of manure (peat moss containing about $12\frac{1}{2}$ per cent. of moisture absorbing about seven times its weight of liquid) and this sold at, say, 5s. per ton would produce £6. The total gross cost per annum of this improvement would be about £312—reckoning the cost of the peat at 30/- per ton (delivered and powdered). If the whole of the manure made were sold at 5s. per ton this would realise £312 per annum. It must not be forgotten that if peat were used no disinfectant powder need be used. Therefore, the £312 should be credited with the cost of disinfectants. The peat would take its place and we should thus be able to write off a sum of at least £35 per annum from the nightsoil estimates to begin with.

The principal saving, however, would be in the time taken to scavenge the pails. For the scavenging of *pails alone* we employ four carts and 12 men. The total annual cost of this is about £1,000—*this being the cost of men's wages and horse-hire alone*. I estimate that there should be no difficulty whatever if this work could be done in the day-time in doing it with three carts and nine men, at a cost of about £750. The work could be more quickly done in the day-time for more reasons than appear on the surface.

There would thus be a saving of about £250 per annum at once *in wages and horse-hire alone*.

For a sum of about £35 I could try the system in every pail-closet in the town for four weeks. There would in this case be no necessity

at first for any grinding or powdering machinery, for the peat could be obtained ready powdered. If the system failed there would be no great loss, and if it proved capable of solving the problem which has confronted us for so many years, and is still growing, your Committee would have earned the thanks of every ratepayer in the town.

In addition to using peat in the pail-closets I think it would be advisable also to place in every fixed receptacle, when cleansed, about 10lbs. of powdered peat. The nuisance from these structures would then be greatly diminished, and it might be possible to empty them in the day-time. This arrangement could continue to be carried out until the fixed receptacles were done away with. Instead of placing it in these receptacles it might be supplied to the occupiers for use as occasion required.

But for the evils existing in connection with the foregoing system—the conservancy systems—there is but one *permanently* satisfactory remedy—the substitution of a water-carriage system. All others are more or less palliative in their nature.

Not only have all conservancy systems been proved up to the hilt to be by far the most expensive, and to be constant causes of serious nuisance, but they have also been shown beyond doubt to be amongst the most constant factors in the production of such diseases as Typhoid Fever, Cholera, Diarrhœa, and Diphtheria.

The following evidence in support of that statement could be multiplied to almost any extent.

Every ashpit or midden occupies a certain superficial area. This area, except where it is absolutely impervious, and this is only found on *extremely* rare occasions (I do not recollect ever having seen one), is liable to pollution by the contents of the ashpit. Now, every square yard of ground so polluted is a serious and very real danger to the health of the inhabitants of a town. The report of Dr. Ballard, one of the Medical Officers of the Local Government Board, shewed beyond doubt that this surface pollution of the soil was a cause of epidemic Diarrhœa. The micro-organisms, which are the cause of this disease, flourish in the upper layers of the soil and are carried from there by winds and insuction of ground air into houses, on to milk and other food material, which they poison. These micro-organisms can only live when they are supplied with food-material and the food-material

upon which they thrive best is decomposing organic matter, such as that which soaks into the soil from badly constructed ashpits and similar receptacles.

There is always a great danger in putrefactive processes going on in the vicinity of human dwellings, for not only are the intermediate gaseous products of such processes poisonous, but as stated above, organic matter, and especially organic matter in a state of decay affords the best nutriment to many disease organisms. The bacilli of Typhoid Fever, for example, if thrown into a midden or cesspool-privy, would undoubtedly flourish and increase largely in numbers, whereas the same bacilli thrown into a water closet *even without the addition of disinfectant* would probably not live more than a few days.

Quite recently, Dr. Robertson, Medical Officer of Health for Sheffield, has clearly demonstrated the fact that Typhoid bacilli will *multiply* in soil, such as that about a privy midden, for at least 143 days and he found them alive at the end of 315 days. Dr. Sidney Martin and Professor Delépine have both demonstrated practically the same thing.

Experiments made by Uffelmann show that Typhoid bacilli may retain their power of development and growth in house and street sweepings for at least 30 days in a dry air, and a much longer time in a moist atmosphere such as one gets in a midden.

But there are those who will set all this aside as mere theory. Therefore we must endeavour to show how practice bears it out.

Dr. Robertson has shewn that in St. Helens there were in 1894 four times as many cases of Typhoid Fever in houses having privy-middens as there were in houses having water closets, and the cases were also more frequently fatal in the privy-midden houses. In 1893 in the same town the death-rate from Typhoid Fever was the highest but one in the whole of the large towns of England—Sunderland being the unenviable first. Dr. Nichol, the Medical Officer of Health for that year, states in his Annual Report for 1893,—“Typhoid Fever occurred twice as frequently in houses on the midden system as in houses on the tub and pail system, and three times as frequently in midden houses as in houses on the water closet system.” This he states is in accordance with the results obtained in previous years.

Prof. Corfield speaking on the prevention of Typhoid Fever at the

Royal Medical and Chirurgical Society, on January 11th of last year said—"As a matter of fact those parts of the country where the water-carriage system was not carried out in its entirety and where numbers of houses were provided with so called dry closets of one kind and another, were precisely those parts of the country where Enteric Fever prevailed. London was perhaps the most complete example among the large towns, not only in this country but in the world of a water-closetted town and the death-rate of London from Enteric Fever during the 10 years 1881—1890 was less than that of the country generally. The high Enteric Fever death-rates were all in those countries where the water-carriage system was least adopted." (*British Medical Journal*, January 15th, 1898.)

The number of privy-middens in a town is now taken as a guide to the sanitary condition of that town, and one has not far to go to find the reason for this. It is invariably found that the death-rate is higher in privy-midden towns than in water closet towns, and even comparing privy-midden areas with water closet areas in the same town, the death-rate is invariably higher in the former than in the latter. Dr. Vernon, Medical Officer of Health of Southport, in a discussion at a Conference held by the Manchester and Salford Sanitary Association, on May 23rd of last year, stated that in a privy-midden area in that town the general death-rate was 26 per thousand, as compared with 14 per thousand in a water closet area *strictly comparable in every other respect*.

The following figures collected by Dr. Scurfield, of Sunderland, put the same clearly recognised fact in another way.

Death-Rates during the Six Years 1890 to 1895.

	All causes.	Fever.	Diarrhœa.
(a) 33 large towns where privy-middens exceed 5 per cent. of the population	20·97	0·26	1·06
(b) 24 large water-closet towns	18·3	0·15	0·62

Dr. A. Bruce Low, one of the Local Government Board Medical Inspectors, in reporting on an epidemic of Typhoid Fever in Middlesborough in 1896 states that the percentage incidence of attacks was as follows:—

On privy-midden houses	...	...	...	...	9.77
On pail closet houses	...	...	...	...	7.09
On water closet houses	...	...	...	...	1.62

Dr. Boobyer, of Nottingham, in a paper read at the Sanitary Institute Congress, 1898, discussing the incidence of cases of Typhoid Fever on different parts of the city makes use of the following words:—

“If we summarise the figures for the 10 years 1887—1896, we find that the annual average rate of incidence upon each class of house has been as follows:—(1) upon pail-closet houses one case in 120; (2) upon midden-privy houses one case in 37; and (3) upon water closet houses one case in 558. In other words, the proportional incidence of the disease upon houses with privies was more than three times as great as that upon houses with pail-closets, and that upon houses with pail-closets more than $4\frac{1}{2}$ times greater than that upon houses with water closets. The different types of closets are intermingled in all parts of the town, and, except in distinctly good neighbourhoods, the incidence and ratio of incidence is remarkably general and uniform.

“The seasonal distribution of the disease shows considerable variation according to the type of closet. During the five years ending with 1896, the totals of the quarterly numbers of cases recorded in successive quarters, in houses furnished with pail-closets, privies, and water closets respectively, were as follows:—

Five years, 1891 to 1896.

Type of Closet.	1st Qrs.	2nd Qrs.	3rd Qrs.	4th Qrs.
Pail Closets	365 cases.	206 cases.	512 cases.	619 cases.
Midden-privy	23 „	19 „	26 „	31 „
W.C.	16 „	6 „	25 „	30 „

“The conclusions, I take it, are briefly as follows:—

1. That the conservancy closets—(privies and pail-closets)—as we know them, not as theorists paint them—are capable of playing a very active part in maintaining and propagating endemic Enteric Fever.

2. That their capacity in this respect, and for obvious reasons, is greatly augmented by an unpaved condition of courts, alleys, and yards, and all that the expression ‘a dense and poor neighbourhood’ connotes.

3. That the comparative immunity from Typhoid incidence of

decently built modern houses with water closets can be seen even in town where Typhoid Fever is and has been endemic for many years, and also in the poorer neighbourhoods of these towns."

In the discussion on the paper, Dr. Clare (Hanley) said he had been much struck by the paper, inasmuch as at Hanley they had the same arrangement—privies, pail closets, and water closets. He wished to point out, however, that there were different kinds of water closets; there were the hand-feeding closets, slop closets, and water closets proper, with a cistern. He had found cases of Typhoid Fever most frequent with the pail closets, next with the hand-feeding water closets and slop closets, next with privies, and next with proper water closets.

Dr. Charles Porter, Medical Officer of Health, Stockport, quotes the following convincing figures.

Table shewing for the five years 1893-97 the incidence of Typhoid Fever in Stockport upon Privy-pit houses and Water-closet houses.

Rateable Value.	Privy Pit Houses.		Water-Closet Houses.		Typhoid Incidence per centum of	
	Average Number	Cases Typhoid Fever.	Average Number	Cases of Typhoid Notified	Privy Houses.	W. C. Houses.
Under £5	2811	54	176	1	1·92	0·56
£5 and under £8	7771	275	703	3	3·53	0·42
£8 ,, £10	1415	57	716	9	4·04	1·20
£10 ,, £12	1077	42	425	8	3·89	1·88
£12 ,, £14	449	16	225	4	3·56	1·77
£14 ,, £20	656	30	613	8	4·57	1·30
£20 ,, £30	249	13	374	2	5·22	0·53
£30 and upwards	117	8	369	9*	5·44	2·43*
	14575	495	3631	44*	3·39	1·21*

* This figure does not include two cases which were reported from the Infirmary, and four reported from the Workhouse Hospital.

I could add largely to these figures but do not wish to rely upon being heard merely because of my "much speaking."

I could produce numbers of letters from persons complaining not only of the nuisance from the foul smells caused by cesspool privies,

fixed receptacles, and mixens, but also numerous instances of illness such as Diarrhœa, Sore Throat and sickness of various other kinds produced by the same means. At the very time of writing this Report I have a visit from a person who states that there have been about seven cases of severe Diarrhœa in her own and her neighbours' houses owing to the offensive condition of the mixens, the smell from which permeates the whole house.

In a number of towns the Sanitary Authorities are so convinced of the advantages of water closets *from a pecuniary point of view* that they actually bear a preportion of the cost of converting privies into water closets. *Accrington* pays half the cost—up to £2—of conversion from pails to water closets. *Burslem* pays half the entire cost. *Stafford* pays half entire cost if existing accommodation is good. *Sheffield* pays one-third of cost. In *Wolverhampton* the Corporation defray all cost except the closet itself, viz., about 25s. In *Leicester* it is stated that in cases where there is no nuisance, the Corporation will no doubt bear the whole cost of the conversion of pail closets to water closets. In *Hanley* £1 is paid by the Corporation in each case. *Leeds* pays one-third in cases of re-conversion.

Bolton has recently obtained the sanction of the Local Government Board to the borrowing of £10,000 for the conversion of the most insanitary privies into water closets. They have the power to do this under a Local Improvement Act.

As it may be objected that the conditions of population, refuse disposal, sewage disposal, and other matters, may differ widely from those in this town, I give these particulars herewith:—

A few notes on the practice in the above-mentioned towns may be helpful.

Town.	Popula- tion. 1898.	Acre- age.	Midd'n Privies	Pail Closets	Water Closets	Waste Water Closets	Sewage Disposal System.
Accrington ...	40,500	3425	800	2800	400	4900	Lime Precipitation.
Burslem ...	32,251	2585	4500	30	1500	1500	Irrigation.
Stafford ...	20,270	1084	Just abolish- ing last few.		1649	2140	Precipitation & Land Filtration.
Wolverhampt'n	84,000	3440	Not many.	14000	2000	900	Precipitation & Irri- gation (600 acres).
Leicester ...	184,547	8534	2080	7639	12096	20	Broad Irrigation (200 acres).
Hanley ...	56,547	1768	3270	3440	700	3320	Precipitation & Irri- gation.
Leeds ...	388,761	21572	3642	1096	31453	None.	Lime Precipitation.

In the Borough of *Accrington* the system of conversion of pail closets to water closets was commenced, it is believed, in 1892, the Corporation bearing half the cost as above stated. It was stated in the advertisement announcing the arrangement that preference would be given to applicants in respect of pail closets adjoining a back road recently paved and properly sewered, and further, that as a sum of £500 only was to be voted for this purpose each year, the applications would be considered in the order in which they were received. The applicants were requested to state the date of erection of the existing closets, the particular system of water closet it was intended to adopt, the name of the builder who would carry out the work, and the date when the work would be commenced. Before the Corporation made any payment their Inspector or Clerk of Works was to give a certificate stating that the work had been carried out in accordance with a lithographed plan, supplied to the property owner by the Corporation, and in every respect to the requirements of the Corporation.

In *Hanley*, as stated above, the owners of property where Rochdale pails were in use (and as has been pointed out the Rochdale pails are very much more sanitary than the galvanised-iron pails in use in this town) were allowed the sum of £1 in respect of each closet towards the cost of converting the same into a slop-water flushing, or clean-water closet, the conversion to be effected to the satisfaction of the Sanitary Committee, and the old pails and guards to become the property of the Corporation. Where slop-water closets without flushing apparatus were in use the Corporation undertook to convert the same into flushing slop-water closets, or if desired, into clean-water closets, upon payment in advance to the Corporation of the sum of £1 in respect of each closet to be so converted, this offer to remain open for a period of two years.

In *Leeds* the City Council pay about one-third of the whole cost of converting into water closets, but this is only done when the Council have previously had the original and approved privies converted *at their request* into some other form of privy. For example, if the Council had at some past time required the conversion of a midden-privy into a pail privy, and had at that time approved of this pail privy, then in the event of their subsequently requiring the pail privy to be converted into a water closet, they would pay one-third of the cost of this latter conversion. The Leeds Authority do not generally

call for a second alteration unless the building is also getting somewhat out of repair; the contribution of one-third of the cost is then reckoned as about covering the cost of alteration in the principle of the system.

In *Sheffield* for the year ending 25th March, 1894, the contribution by the Corporation, which is about one-third of the cost of re-construction, amounted to £595, and for the year ending 25th March, 1895, it cost £725. The work in the case of Sheffield is done under a Local Act. (See Appendix.)

In *Stafford* it is stated that when the existing closet accommodation is good the Corporation bears the whole expense of conversion, but where the structure of the privy is defective or bad the owner must contribute a proportion equivalent to the sum it would cost to put the existing closet into good order.

Mr. Berrington, at one time Borough Engineer of Wolverhampton, where the pail system is in use, makes use of the following noteworthy statement—"Suppose it were possible to abolish the pail system altogether, say in one year, then I contend that in 20 years from now, Wolverhampton would be pecuniarily benefited to the extent of £115,320. Of course it would cost something to alter the system. Supposing it cost £2 per house and there are 13,000 pails, that represents £26,000."

Then by an immediate change of the pails in use to slop-water closets, a saving of £111,920 would be effected, and by abolishing the necessity for providing new pails during 20 years (the Corporation here as in many towns providing pails) £29,400 would be saved. This would give a total saving in 20 years of £141,320. Deducting the cost of changing the pails this gives a net saving in 20 years of £115,000. The probable increase in the population during the 20 years is taken into account in these figures, but the cost of conversion I regard as too low an estimate. However, taking the same figures and increasing the estimate of the cost of conversion to £3 per closet (a high estimate when a large number of houses are concerned) that would represent an expenditure of £39,000 in changing the system, and would still leave the net saving in 20 years at a handsome figure, namely, £102,320.

The argument against water carriage based upon the water supply difficulty is one which needs careful examination. In a town such as

this it is apt to carry considerable weight. But I think a perusal of the facts to follow will shew that putting the difficulty at its worst it is not by any means one which should stand in the way of the suggested reform.

Inquiries from 12 towns which are either entirely water closet towns or have a large number of water closets elicited the important fact that the average consumption of water per head per day by one water closet is from four to five gallons. In Blackburn it is stated that this matter has been specially tested by meter, taking a water closet area against a pail closet area, and the result was that in houses with one water closet from four to five gallons of water per head per day was consumed. I quote from a letter received from the Borough Engineer of Blackburn.—“Two districts in the town were chosen where the class of property was similar, and the result showed an increase of four to five gallons per head per day in the water closet area. The number of persons in each house was taken at five, and the water closets were fitted ordinary double-valve cisterns (not syphons) having a flushing capacity of not less than two nor more than two and a-half gallons each. The householders were not aware that any experiments were being made, and the observations were taken during the spring of the year and extended over a period of some three months.”

“I may add that where an efficient and ample system of sewage disposal is in operation the conversion of privies and pails to water closets is to be recommended both from a sanitary and economical point of view.”

Taking these figures at their highest, namely, five gallons per head per day, and assuming each house to contain five persons, the daily consumption of water for water closet purposes alone would be 25 gallons, or 9,000 gallons per annum, equivalent to a cost of about 7s. per annum with water at 9½d. per thousand gallons delivered. The cost of emptying a pail closet, as has been stated, is about 10s. per annum, and the cost of emptying fixed receptacles, cesspool-privies, etc., is more than this. The figures from which this is worked out vary from a minimum of two to a maximum of seven gallons per head per day for one water closet.

The following replies to enquiries sent out to towns having a large number of water closets supply useful information on this point.

1. *Is it your opinion that water closets lead to waste of water by leakage or otherwise ?*

The replies are as follows :—

- (a) Not to any appreciable extent.
- (b) Only to a small extent.
- (c) Not with proper plumbing.
- (d) Not necessarily, but all water fittings when out of repair waste water.
- (e) Not much.
- (f) Yes, to a slight extent.
- (g) Not to a great extent.
- (h) Not appreciably ; and
- (i) Yes, where they are not properly designed and constructed, but this can be controlled by the Deacon Meter system of inspection for waste.

Of the other replies five are negative and unqualified and four are affirmative and also unqualified. The balance of opinion would thus appear to be decidedly against the idea that water closets lead to any appreciable waste of water.

2. *Is it your opinion that by water closets coming into more general use the amount of water consumption has been appreciably increased ?*

A large number of towns can give no information on this point, not having data to work from. Those who do reply give the following answers :—

- (a) Very little indeed.
- (b) More water is certainly required, but the increase in consumption is not perceptible.

Two towns give an unqualified negative reply.

Some opponents of the water-carriage system are so impregnated with the idea that the system consumes a vast amount of water that they propose that the Water Department should make a charge to the Sanitary Department to cover it. Though to the Corporation as a whole the carrying out of the proposal would make no difference, yet it is scarcely one to be commended on account of the tendency it involves to engender departmental dissension. But if it be made at all then it should be made on a proper basis. Water closets are, of

course, things which consume water, but they are far from being the only things. Baths and lavatory basins are both fixed now, and have been for some years, in large numbers of houses; an increased amount of water is now used for municipal purposes—street-making, street-watering, sewer-flushing, fires, etc., etc.; there are more mains, more service-pipes, and more water-fittings now than formerly, and, therefore, a greater amount lost from accidental leakage.

These things are not taken into account as they should be by those who advocate the above policy.

But even if we grant them all they claim, can they shew us any justification for making any charge except the most trivial one?

The basis upon which the opponents of water-carriage found their claim, is believed to be the increasing consumption of water, as shewn by the Borough Surveyor's estimate of the quantity used per head per day, or per annum. But this estimate is based upon a population of 35,000 and your Surveyor has told his Committee that he has serious doubts of its accuracy on that account. This basis of calculation, it is believed, has not been altered for some time, in spite of the unquestionable increase of population.

But if we take an estimate based upon a number which is accurately known for each year—the number of inhabited houses—we shall find that the vast consumption of water by water closets is more or less of a bogey. Take the figures from the years 1891 onwards, and I may say these figures are taken from the accounts for water sent in by the London and North Western Railway Company and, therefore, represent the exact amount of water paid for by the Borough.

Year.	Gallons consumed during year.	No. of Inhabited Houses.	Consumption per House per annum in gallons.	Plans of New Houses passed.
1891	86,793,000	6,542	13,267	139
1892	85,028,000	6,816	12,474	169
1893	95,848,000	7,125	13,452	157
1894	113,769,300	7,190	15,823	238
1895	119,236,000	7,404	16,104	283
1896	128,333,700	7,638	16,802	317
1897	128,588,000	7,945	16,183	441
1898	140,055,000	8,182	17,117	308

The average *gross* increase in water-consumption per annum taking the above figures is $6\frac{1}{2}$ million gallons, representing a money-value of about £250.

The proportion of this which is probably due to the erection of new houses, or the increasing number of inhabited houses may be judged from the other figures in the above table.

The figures for the last few years are particularly convincing. In spite of the fact that in recent years the majority of new houses erected have been provided with water closets, *the water-consumption shows very little variation*, and in 1897 as compared with 1896 it shows a *decrease* instead of an increase though in this year the plans of new houses passed reached the highest figure yet recorded.

If a transfer were therefore to be made on anything like a fair basis debiting the Sanitary Department and crediting the Water Department it would have to be a very trifling one.

It is generally stated that the increase in the volume of sewage consequent upon the general adoption of water closets is enormous. I am inclined to think that this increase is very much less than it is generally supposed to be, and I am supported in this opinion by the statements of a large number of experienced Engineers, some of whose remarks I submit later in the Report.

The argument sometimes brought against the water-carriage system that extra drains and sewers are necessary is one which can be readily put aside, for drains and sewers must exist for the carriage of ordinary waste water. The only point left to be determined is whether it is advisable to admit excreta to the drains and sewers already provided or not.

The following analysis of the sewage of water closet towns as compared with that of privy-midden towns indicates that the water closet element in sewage is no more offensive than the ordinary waste-water element. This is now granted by practically everyone in the sanitary and engineering world.

The Figures give the Parts per 100,000.

	Midden Towns.	Water-Closet Towns.	Slop-closet Village in Staffordshire.
Total Solids in Solution ...	82.4	72.2	.....
Organic Carbon	4.181	4.696	.....
„ Nitrogen	1.975	2.205	.....
Ammonia	5.435	6.703	{ Free 19.7 Organic 2.58
Total combined Nitrogen	6.451	7.728	.....
Chlorine	11.54	10.66	19.6
Suspended { Mineral ...	17.81	24.18	...
{ Organic	21.39	20.51	.....
Matters { Total	39.11	44.69	.....

The analyses given shew clearly that there is practically no difference between the chemical composition of the sewage of a water closet town and that of a privy-midden town. The only difference is that the volume of sewage is greater in the water closet town than in the privy-midden town.

In a town such as this, where the sewage has to be pumped, this increase of volume is one which must be carefully looked at.

The experience of the following towns will here again be useful. The question was asked—*Is it your opinion that an increase in the amount of water closet sewage causes an increased difficulty in the disposal of the sewage on land or otherwise?*

The replies are :—

- (1) In *Leamington*, where our sewage is disposed of by irrigation, I should say the water closet constituted the best element.
- (2) *West Ham*—No; an advantage.
- (3) *St. Helens*—If on land, No.; if treated chemically probably more chemicals would have to be used.

(4) *Salford*—No; but rather the other way. In our case, where there is much liquid refuse from manufacturers' sewage, we find the water-carriage system far more economical and inoffensive.

(5) *Leicester*—To the extent that there is a slight increase in the volume of sewage it does.

An increased difficulty in sewage disposal is said to occur in Gloucester, Bolton, and Blackburn (slight only).

A negative and unqualified reply to the question is given by six towns, viz., Oldham, Chesterfield, Cambridge, Dewsbury, Keighley, and Huddersfield. Experience shews, therefore, that the argument under this head has little practical foundation.

Coming to another important objection against the water closet system—injury from frost to out-door water closets. Opinions differ to a considerable extent on this question, but the experiments made by Dr. Reid in two towns in Staffordshire, throw much light on the matter. These experiments were made during the very severe frost of 1895, and give the following results:—

In town "A" 157 water closets were examined, and in these 119 supply pipes, 112 cisterns, and the whole of the pans were frozen. Of the 119 frozen supply pipes 30 were ultimately fractured, and of the 157 frozen pans three were ultimately fractured. *Dr. Reid says "that in this town the plumbing was of the most inferior description."*

In town "B" 201 water closets were examined. 196 supply pipes were found to be frozen, 180 cisterns, and the whole of the pans. Of the 196 frozen supply pipes eight were ultimately fractured; of the 180 frozen cisterns six were ultimately broken, and of the 201 frozen pans four ultimately broke. In town "B" the percentage of frozen supply pipes which ultimately burst was about six times less than in town "A" *owing to the inferior class of the plumbing in the latter town.*

Dr. Reid does not draw any conclusions from these observations.

It is of course apparent that, as he says, the injury resulting from frost may differ greatly in different towns.

The following records are also interesting and helpful:—

Blackburn, 1891, by Dr. Barwise.

No. of closets observed, 456.

Supply pipes frozen, 191. Supply pipes burst, 30.

Cisterns frozen, 191. Flush pipes burst, 3.

Nottingham, 1892-3, by Dr. Boobyer.

570 closets observed on two occasions.

(a) Temperature 10 degrees below freezing and *no wind*; 42 frozen; seven burst.(b) Temperature 1—10 degrees below freezing and *much wind*; nearly all frozen.

During this period a large number of trough closets (used in schools and factories) were frozen, but those with water surface one foot below ground-level escaped.

Sheffield, by Dr. Littlejohn, 1892-3.

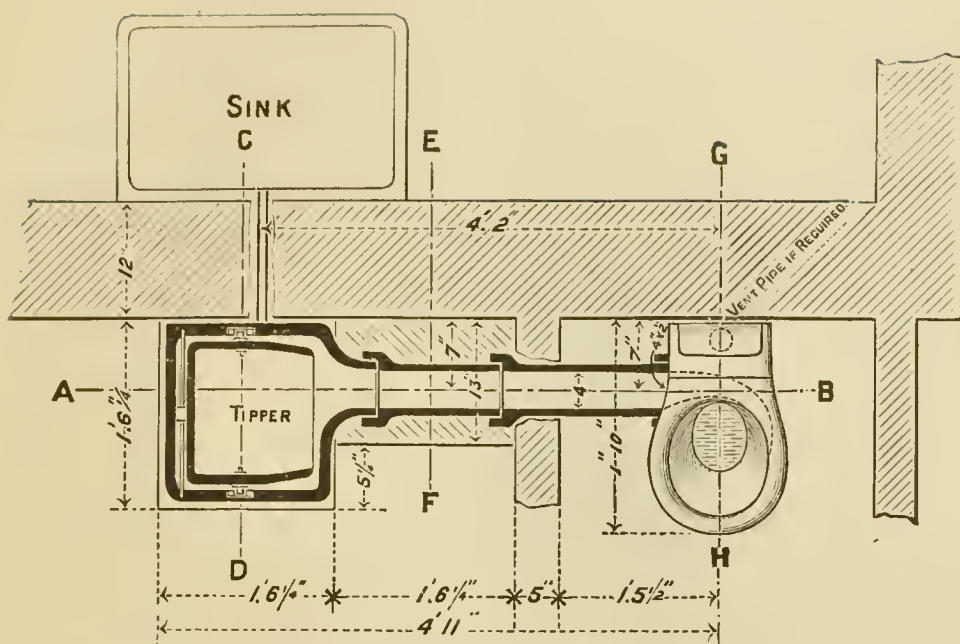
Forty-five automatic trough closets observed from 23rd December, 1892, to 10th January, 1893, when temperature varied from 1 to 17 degrees of frost.

Closets.	Frozen.	Protected by boxing in of pipes and cisterns.	Partially protected.	Unprotected.
45	22	9	12	24
Of the 22 Frozen	...	2	8	12

The meters and supply pipes were the first parts to freeze up, and the tanks did not tend to become affected so long as the feed of water continued.

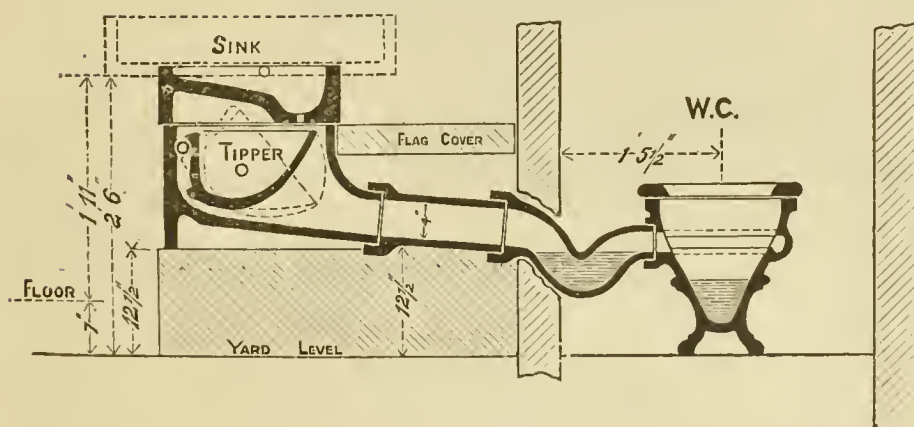
The result of the experience of several other towns was also asked on this point. In two cases the reply was that no difficulty whatever was experienced from frost. In other cases, as was to be expected, cut-door closets are said to cause difficulty by freezing up, but this freezing up is stated not to occur if the pipes are properly cased and protected, if the top vents to all outside closets are closed, when the pipes, etc., are not in exposed positions, and when the basins are encased in concrete. It is stated that water closet fittings do not freeze any more than other water fittings, and the opinion is expressed generally that difficulties of this nature are almost entirely due to lack of obvious precautions.

Further information on this point and some suggestions for its remedy will be found later in the Report.

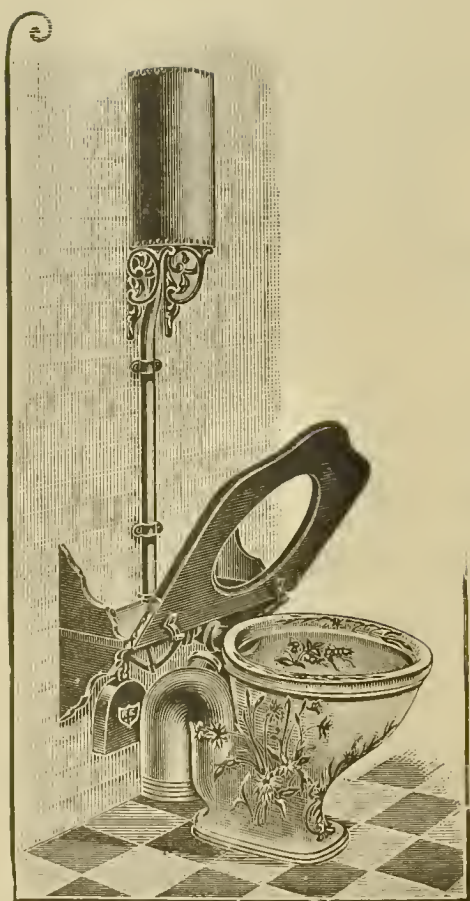


MESSRS. DUCKETT & SON'S "CLENCHER" WASTE-WATER CLOSET.

(Flushed from top).



Section of above Closet on line AB.



MESSRS. EVERED & Co.'s
PNEUMATIC-ACTION WATER CLOSET.

"The cistern is always empty, except during the time the seat is down, hence it cannot freeze."

The nature of the building in which water closets are placed, the strength and position of the pipes and fittings, the quality of the plumbing work, and the precautions which are taken by householders, of course, are factors of the highest importance in determining whether injury shall or shall not result to a water closet or its fittings from frost.

One frequently hears it stated that if water closets were supplied direct from the mains instead of through the medium of a cistern, there would be less leakage and less liability to damage by frost. These two statements might or might not be true, but, on the other hand, we have it as a demonstrated fact that a number of outbreaks of Typhoid Fever have resulted from the supply of water to water closets direct from the mains. It can be readily seen that when any intermission in pressure in the main occurs foul air and other matters may be sucked into the service pipe and it is in this way that water supplies have on several occasions become contaminated.

In one of the illustrations there is shewn a form of closet in which the cistern is always empty, except when the closet is in use, and thus the chance of freezing is practically nil. When the closet is in use, and the seat is lowered a valve is opened and water is allowed to rise and fill the cistern; as soon as the seat is allowed to spring up water stops coming in through the service-pipe and flows out of the cistern to flush the basin of the water closet. There is said to be absolutely no danger of contamination of the water in the service-pipe, and on a very careful personal examination I could not satisfy myself that there was any risk.

Probably the most genuine argument that can be used against the general adoption of water closets is that they are unsuitable for a working class population. But in Liverpool, Salford, Birmingham, and many other large towns, wash-down water closets are used and, by the exercise of a careful supervision by Sanitary Officials, they are maintained free from nuisance.

In order the better to arrive at the truth of the matter a number of towns were asked the following question:—*Do you find any difficulty in the poor parts of the town with water closets?*

The answers are as follows:—*Oldham*—Yes, for a time until the users get educated to the proper use of a water closet. *Huddersfield*—

No difficulty when properly attended to. *Dewsbury*—No. *Gloucester*—We have occasional stoppages in the poorer parts of the district, generally caused by damage to the flushing apparatus, but these are not nearly so serious as they used to be. *Cambridge*—Yes; from insufficient flushing by the occupiers. *Bolton*—No. *St. Helens*—Not at present. *Leamington*—With waste-water closets used in common by several families there is a difficulty. A proper water closet does not present this difficulty to the same extent. *Cardiff*—No. *Chesterfield*—No. *Leicester*—Only occasionally. *Harrogate*—No. *Salford*—No serious difficulty. *Nottingham*—Yes. *Preston*—No. *Blackburn*—Not more so than in any other part of the town.

It will be seen that by far the majority of these replies are encouraging. In those towns where the system is yet in its infancy, so to speak, there does appear to be a difficulty with water closets, but there is a difficulty with every new system until the public get a proper knowledge of it. People did not know the use of water or gas fittings properly at first, but a remedy was soon found for that, and a similar remedy can be easily applied to water closets if necessary.

Experiences of such large towns as Salford, Preston, Cardiff, St. Helens, and Bolton, is surely sufficient guarantee that the difficulty is not so great as it would appear, and is one which can be speedily overcome.

The opponents of the water-carriage system have, it has been asserted, an incontrovertible argument in the fact that if the sewers are, or eventually become, defective the leakage of water closet sewage into the soil will be very much worse than if the sewage consisted of nothing worse than household slop-water. Everyone knows now, however, that slop-water is certainly not the inoffensive substance it was once thought to be. The analyses given in a previous part of the Report shew that there is practically no difference in composition between the sewage of water-closetted towns and those without any water closets at all.

The same answer may be given to those who say that the sewer-ventilation difficulty will be increased. Both of these things are merely 'bogies' raised for the want of an argument with a bottom to it.

There are one or two arguments in favour of the water-carriage system which do not usually receive the attention which they merit.

As pointed out by Professor Lane Notter, the water which is supplied for domestic purposes gives us at once the necessary motive force for removal at the cheapest rate, and it is in reality a waste of economy to allow this water to pass off without applying the force which has been accumulated in it for some suitable purpose such as the carriage of excreta

As a matter of convenience, water closets which are the only receptacles for excreta which can be safely constructed within the house, take undoubted precedence of every other kind of closet. In times of sickness and in the case of delicate people this convenience amounts to a necessity. It may be urged that water closets constructed inside a house afford a means for the entrance of sewer gas, but a danger of this kind cannot possibly occur unless there is some serious fault in construction or management. This possibility of the entrance of sewer gas is not limited to water closets, but applies with equal force to baths, lavatories, kitchen sinks, cellar drains, etc.

Some towns (for example, Brighouse, with a population of 24,000) in order to encourage owners of property to adopt water closets, give a supply of water to one water closet per house free of cost. In the town mentioned the pail system was practically in general use, but the Corporation found that the amount of water necessary for washing out the tubs was about one-half of that which would be used in an ordinary water closet; the Authority, therefore, was not in reality so generous as would appear at first sight. This statement may be usefully considered by those who would continue the pail system but would adopt a method of washing out the pails.

In Manchester, in spite of the serious problem of sewage disposal, the City Council so approve of the modern water-carriage system that over 400 pail or midden closets are being converted into water closets every year. Over 1200 have been so altered during the past three years. This is accompanied (according to the statements of responsible officials) by a corresponding annual diminution in the cost of the night soil department. The work is chiefly done under Section 41 of the Public Health Act, 1875, which is not so hedged round with provisos and exceptions as Section 36 of the same Act.

In Glasgow, under the Police (Amendment) Act of 1890, Section 38, power has been obtained to require the conversion of cesspool-privies or privies combined with ashpits into such accommodation as the Police Commissioners shall approve, the work to be done within one month of notice under a penalty of £5 and a daily penalty of 40/-. Under this Section, I am informed, from the passing of the Act until October, 1898, 9,791 water closets have been introduced at the instance of the Sanitary Department. Privies are quickly being abolished, and Glasgow is now practically a water closet town.

I could multiply instances of this kind to almost any extent, but have no desire to labour the point. Those given already are sufficient to shew any but the most biassed persons that the water-carriage system has everything to recommend it.

As a way to meet the difficulties connected with the water-consumption and sewage-disposal parts of this question, and several of the other objections previously discussed, the provision of slop-water closets has been advised, and it may, therefore, be well to consider their advantages and disadvantages.

ADVANTAGES CLAIMED.

1. There is considerably less consumption of water.

To take the experience of other towns on this particular point I may quote from Dr. Porter, of Stockport. "To test the truth of this proposition in regard to the *economy of water*, two blocks of exactly similar houses were selected in Stockport. At the request and expense of the Sanitary Committee, the water supplied to each block between 7 a.m. on October 28th, 1896, and 7.30 a.m. on May 13th, 1897, was metered by the Water Company, with the following results:—

Lot A.—Ten houses with waste-water closets used 65,720 gallons, or 33.3 gallons per house per day.

Lot B.—Fourteen houses with ordinary water closets used 151,320 gallons, or 54.8 gallons per house per day.

This shews a saving of exactly 21.5 gallons per house per day in slop-water houses.

In a similar and more recent experiment Mr. De Courcy Meade, M.I.C.E. (City Surveyor of Manchester), has curiously enough obtained an exactly identical result."

2. There is no trouble occasioned by the freezing of pipes and cisterns. This is an important consideration here, for water closets would, in the large majority of cases, have to be constructed out of doors. Experience has shown that there is a slight trouble in connection with the freezing of gullics, but the trouble does not extend to the working parts of the slop-water closet.

3. There is no increase in the volume of sewage, and

4. There are no mechanical contrivances such as ball-valves, chain-pulls, etc., to get out of order.

DISADVANTAGES.

1. Slop-water closets, as generally made, are liable to get fouled in the interior. This disadvantage is surely one which can be overcome. Persons of cleanly habits find no difficulty whatever in keeping the interior of slop-water closets clean and free from offence. It needs but the application of a long-handled brush combined with two or three bucketsful of clean water every week to keep these closets perfectly clean. Precisely the same objection might be raised against ordinary water closets which, as is well known, will get into a foul and offensive state if not carefully and regularly cleansed in a similar way to that suggested for slop-water closets. I am convinced that if manufacturers would make slop-water closets with the interior of the pedestal and the pipe below this of cane or straw colour, it would not only demonstrate more plainly the necessity but also add materially to the ease of keeping the closets clean. In what is known as the "perfect type" of slop-water closet there is little or no soiling of the interior and there are now several types of slop-water closet in which the pan is made in the same shape as an ordinary short hopper closet, is flushed from the top, and is therefore easily kept clean. (See illustration).

2. Slop-closets render the drains connected with them liable to blockage--tin cans, bricks, etc., sometimes being thrown into them, and, therefore, property owners are put to expense in setting them right.

Many property owners now post up a notice inside closets, stating that they will hold the occupier of the house liable for the expense incurred in removing any blockage to the drain when it can be clearly shewn that such blockage was caused by wilful neglect, and I take it

they are within their legal rights in thus protecting their property and themselves. The London and North Western Company, who have a very large number of slop-water closets in their property, make, I believe, a charge of 2s. 6d. in every case where they have to send to one of their houses to open up a blocked closet or drain. A closet, however, is now made, the upper part of which is like the hopper pan of an ordinary water closet, the outlet being some $2\frac{1}{2}$ inches in diameter (Messrs. Oates and Green's anti-fouling cone). This renders the drain connected with the slop-closet to all intents and purposes no more liable to blockage than those connected with an ordinary water closet. This arrangement has another advantage too, for it renders the cleaning of the closet an easy matter.

3. The volume of the sewage would be lessened and, therefore, it would have a poorer flushing power. As against this it has to be remembered that a large number of people who use slop-water closets make a practice of leaving the tap running for about five minutes every morning, in order to flush out their portion of the drain.

4. The sewage is of a much more concentrated quality (as shewn by Dr. Reid's analyses), is less aerated, decomposes more rapidly, and, therefore, on all these accounts is more difficult to dispose of. There is no doubt whatever in my mind that this objection is one which is most fatal to the *general* adoption of the slop-water closet system, though not necessarily so to its partial or limited adoption. It is an objection, too, which is not of quite so much importance in towns where surface water is admitted to the sewers, as here.

Practically speaking there is little or no difference between the original cost of construction of a water closet and of a slop-water closet; in the latter, though the fittings are cheaper, more excavation is needed for the laying of the tipper and for the drains, which have to be a good way below the ground.

In the illustrations there are shewn some of the better forms of slop-water closets. I would direct your attention to the "top-flush" form of slop-water closet, which has many points to recommend it, and which is sufficiently explained by the diagrams. Day's Stafford slop-water closet has the great advantage that the tipper can be easily lifted out and any obstruction readily removed.

Dibble's slop-water closet has some good points but has rather too

many parts, and the flush is liable to be broken by the several bends which appear necessary. I am bound to say, however, that in my experiments with it a good flush was obtained in spite of the bends. It is stated that no complaints have ever been received of smells from the tipper-box which, as will be seen, is fixed inside the house—though with very little trouble it might be fixed outside .

May I conclude with a few criticisms and suggestions on the water-carriage system already established in this town.

1. It appears to me that the capacity of the cistern of any water closet should not be less than three gallons.

My experience of a water closet in which a cistern of a one and a half or two gallons capacity has been used, is that the flush does not prove sufficient, and the chain is consequently pulled twice or three times, hence it frequently happens that a good deal more water is used with a one and a half or two gallon cistern than with a three gallon cistern .

It has been suggested that one cause of the diminished efficacy of a two gallon flush is that the seal of the water closet trap is in many cases exaggerated, or in other words, the trap is made too deep and the water in the trap being larger in amount than necessary is not properly flushed out. In this connection wash-out closets are to be deprecated as breaking the flush of water.

2. I desire to call your attention to the third paragraph of By-law 68 (New Streets and Buildings) which states that water closets are to be furnished with a pan, basin, or other suitable receptacle of non-absorbent material, and of such shape, of such capacity, and of such mode of construction as *to receive and contain a sufficient quantity of water*, and to allow all filth which may from time to time be deposited in such pan, basin, or receptacle *to fall free of the sides thereof, and directly into the water* received and contained in such pan, basin, or receptacle.

This paragraph prohibits the use of the ordinary long hopper closet for the soiling of the sides of this form of closet is absolutely unavoidable. In spite of this, however, long hopper closets have crept into use in a number of houses in the town, and are generally to be found in a dirty condition.

3. I am of opinion that a fair sized window in a water closet or privy is a thing which should be most strictly enforced. It is principally of importance, of course, in ensuring cleanliness, but it has another important value which is often lost sight of, namely, that if the privy or water closet be dark, children are very frequently afraid to stop in it; they are thus led to neglect to some extent nature's call and their health suffers in consequence.

4. The following hints on the structure of water closets taken from an engineering journal are of great practical value.

Build a water closet with its back up to the scullery or kitchen and the door pointing into the yard. Fix a short hopper or wash-down closet (not a wash-out), bedding it with concrete and finishing the concrete with cement. Fix the cistern inside the scullery or kitchen, carrying the flush-pipe and chain-pull through the wall to the closet. The basin and trap should be boarded in, but this boarding should be easily removable. A hinged seat should also be provided.

RECOMMENDATIONS.

1. The main point to be decided by your Committee after a consideration of this Report, is the principle upon which you desire these officials entrusted with the carrying out of the various Sections of the Public Health Acts dealing with insufficient and insanitary privies to act in dealing with those cases which form the subject of complaint to them, or come under their notice in the ordinary routine of inspection.

This would very greatly facilitate our work, and would prevent much of the friction which occasionally arises in connection with notices of the Department, dealing with this class of nuisance.

As indicated in the Report, I am of opinion, in common with practically every other existing sanitarian, that the water-carriage system, though like everything else in the world, it has some drawbacks, is the best, the cheapest, and the most permanently satisfactory system of excrement removal. If your Committee are convinced that that opinion is a correct and proper one, then I ask you to act upon it.

There are in the town about 300 privies of the cesspit or fixed receptacle character which have been in existence for many years, and which are in an insanitary and offensive condition. In addition to these there are about 1,500 uncovered "mixens" and about 250 cover-

ed "mixens" which are, in a slightly less degree perhaps, in the same state.

These are the places which require to be dealt with, and your Committee may deal with them in one of two ways:—

- (a) By obtaining a Provisional Order of the Local Government Board to enable you to subsidise the owners to an extent to be determined by your Committee in the conversion of these structures to water closets. An example of such a Provisional Order is given in the Appendix to this Report. I would specially direct your attention to Article IV., which bears specially upon this matter. The adoption of a clause similar to Article II. would obviate difficulty in the future.
- (b) If your Committee should not feel justified in adopting the suggestion contained in the preceding paragraph, then I feel that I must press for our hands to be strengthened somewhat on the following lines. That where the Inspector of Nuisances finds a privy, etc., in which the following conditions exist and which is by reason of those conditions insufficient, or in an insanitary condition, or such as to cause a nuisance, or to be injurious to health, and where a proper water supply and sewerage facilities exist, he shall report it, without loss of time, to the Health Committee and shall recommend the issue of a notice to construct in its place a water or waste-water closet, if, in his opinion, this offers the best practicable remedy for the existing state of things. The conditions which, in my opinion, should be taken as pointing to the necessity for the conversion into a water closet in preference to any other system are as follows:—
 - (a) There is an available and proper water supply and a sewer within a reasonable distance.
 - (b) The privy is of the cesspit kind, and is in a dilapidated state; the covering broken, the brickwork lining defective, or the structure in too close proximity to any dwelling-house.
 - (c) The privy is of the fixed receptacle type, in too close proximity to any dwelling-house, is not regularly and constantly supplied with any deodorising or absorbent substance in the shape of ashes, etc., or is leaking into the ground, etc.

- (d) The privy is of the privy-midden or mixen type, within 12 feet of any building used for human occupation, is deep, wet, or offensive, is uncovered, or is dilapidated so as to allow leakage of its contents into the ground, yard, etc.

In no case should an owner of property be required to alter the system of privy or closet within five years of its original construction.

2. That the construction of waste-water or slop-water closets be not encouraged.

3. That every person constructing a waste-water closet be requested to ventilate the same and the house drain connected with it by an opening at the ground level as near to the highest point of the house drain as practicable, and by means of a shaft carried up from the closet apparatus to a height of not less than ten feet in a suitable situation.

4. That owners of property having pail closets be required to fix to the seat a galvanized-iron urine guide of suitable size and construction.

5. That the form of water closet known as the long-hopper type be definitely prohibited in the erection of new property and that the Works Committee be recommended to affix a notice to this effect to all plans of dwelling houses, etc., submitted to them.

6. That the permission to construct fixed receptacles in connection with new buildings implied in the existing Building Bye-laws be withdrawn and for that purpose Building Bye-laws Nos. 77 and 78 be rescinded, the Bye-laws to be amended throughout in accordance with that rescission.

7. That in the event of the preceding recommendation not being adopted, all property owners having fixed receptacles should receive special notice of the provisions of Bye-law No. 77 with regard to the application of ashes, dust, etc., and be requested to carry out that Bye-law to the satisfaction of the Health Department.

I have the honour to be, Mr. Chairman and Gentlemen,

Yours faithfully,

MEREDITH YOUNG.

Appendix A.

RE-CONSTRUCTION OF PRIVIES.

BOROUGH OF BOOTLE PROVISIONAL ORDER, dated 11th May, 1897, for partially repealing and altering Local Act.

In this Local Act it was enacted that efficient means of access to privies or ashpits and also to water closets, earth closets, cesspools, etc., should be provided.

This Order grants further powers to the Borough in the matter of *re-constructing privies*, etc.

ARTICLE II. gives power in the case of new buildings for the requirement of water or waste-water closets when a sewer and water supply sufficient for the purpose are reasonably available. When these are not available earth closets or privies and ashpits are to be provided. A penalty of £5 and a daily penalty of 40s. recoverable in a Court of Summary Jurisdiction, are imposed for infringements against the Provisional Order. The report of the Medical Officer of Health or the Borough Surveyor or Inspector of Nuisances is to be handed in to the Corporation, and the certificate is to be practically the same as that under Section 36 of the Public Health Act, 1875. In default of the work being executed the Corporation to do the work specified and recover expenses summarily.

ARTICLE IV. deals with old property and enables the Corporation to convert any existing closet accommodation into a water or waste-water closet, where there is a proper sewer and water supply.

In addition to the water closet a separate receptacle for ashes and house refuse must be provided in this case. In default of the notice being carried out the Corporation to do the work and recover all expenses summarily. There is an important proviso here in which it is stated that if the Medical Officer of Health shall not have certified the existing closet to be insufficient for the necessities of the inhabitants of the building or to be in such a state as to create a nuisance or to be injurious to health then one-half of the expense of conversion shall be borne by the Corporation and the remainder recovered summarily from the owner.

Under ARTICLE V if the works are done for the common benefit of buildings belonging to different owners the apportionment of the expenses shall be made by the Borough Surveyor; or, in case of dispute

by a Court of Summary Jurisdiction. All expenses incurred by the Corporation under this Provisional Order shall either be defrayed by means of borrowed monies, or be paid out of the District Fund or General District Rate. The Corporation may declare any expenses under this Order which are recoverable from the owner to be private improvement expenses, chargeable in accordance with Section 257 of the Public Health Act, 1875.

ARTICLE VIII. gives power of entry for Corporation Officials.

ARTICLE IX. deals with appeal as to reasonableness of expenses charged to owner. It is important to note that the right of appeal here is to be restricted to the ground of reasonableness of the amount of the expense and no other question is then to be raised.

ARTICLE X. gives the Corporation power to make bye-laws with respect to water closets and waste-water closets; such bye-laws may prescribe the description or nature, size, materials, position and level thereof, and of the apparatus and the manner of flushing it.

ARTICLE XI. gives power with the sanction of the Local Government Board for the Corporation to borrow money on security of the District Fund and General District Rate, the sum to be borrowed not exceeding a certain amount to be fixed by the Order—in this case £14,000. Money may be borrowed under Local Loans Act, 1875, or the Public Health Act.

ARTICLE XIII. fixes period of re-payment for monies borrowed at not exceeding 20 years. The re-payment may be made by equal annual instalments of principal, or by equal annual instalments of principal and interest combined, or by means of a sinking fund, or by any of these methods combined. Power of re-borrowing for the purpose of paying off borrowed monies is also granted. Returns shewing the amount of borrowed money re-paid, etc., to be made to the Local Government Board annually

The usual clause as to exemption of Government buildings is inserted.

NOTE.—New buildings here is defined as meaning any building which would be a new building within the meaning of Section 159 of the Public Health Act, 1875.

Appendix B.

SHEFFIELD CORPORATION ACT, 1890.

PRIVIES, DRAINS, &c.—POWER TO ENFORCE ALTERATION OF PRIVIES,
ASHPITS, &c.

21—(1) Where any privy, ashpit, or cesspool is certified by a Medical Officer of Health to be prejudicial to health or an annoyance to the public or neighbourhood, or to be so situate that the removal of refuse therefrom is prejudicial to health or an annoyance to the public or neighbourhood, the Corporation may, by written notice, require the owner of the same within a reasonable time, specified in the notice, to alter such privy or ashpit, or to convert the same into a water closet or earth closet and to abolish such cesspool, as the case may require, to the satisfaction of the Corporation.

(2) If the Corporation so require any privy or ashpit to be so converted, or any cesspool to be abolished, the owner may, by notice in writing, require the Corporation to make such conversion, or to effect such abolition and the Corporation shall thereupon execute and do all works and things necessary for those purposes respectively including the constructing and connecting of all necessary drains and the laying on of water to any such water closet, and shall themselves bear and pay *one third* of the reasonable costs, charges, and expenses thereby incurred by them, and the *remaining two thirds shall be borne and paid by such owner and shall be deemed to be private improvement expenses, and may subject to the right of payment by instalments hereafter contained be recovered accordingly.* If the owner do not make such conversion or effect such abolition, and shall not within one month from the receipt by him of the said notice by the Corporation give to the Corporation notice under the provisions of this sub-section, the Corporation may then execute and do all such necessary works and things in the same manner and subject to the same consequences as if the owner had given the said notice to the Corporation. Nothing, however, in this sub-section shall interfere with or prevent the owner from selecting the Contractor to be employed by the Corporation to do the necessary work who shall be employed by them for that purpose if he be duly qualified for it.

(3) An appeal shall lie from any requirement of and as to the reasonableness of any costs, charges, and expenses claimed by or from the Corporation under this section to a Court of Summary Jurisdiction in the first instance, and from the decision of such Court to a Court of Quarter Sessions, as hereinafter provided.

Appendix C.

EXAMPLE OF BYE-LAW MADE TO FACILITATE DAILY REMOVAL OF HOUSE REFUSE BY SANITARY AUTHORITY.

“The occupier of any premises on which any house refuse may from time to time accumulate, shall on such days and at such hour of the day as the Sanitary Authority shall fix, and shall notify by public announcement in the district, deposit on the curbstone, or on the outer edge of the footpath, immediately in front of such premises, or in such conveniently accessible position on the premises as the Sanitary Authority may prescribe by written notice, served upon the occupier, a moveable receptacle, in which shall be placed for the purpose of removal by or on behalf of the Sanitary Authority, the house refuse which has accumulated on such premises since the preceding collection by or on behalf of the Sanitary Authority.”

Telephone

BOROUGH OF CREWE



Encls. No.

MEDICAL OFFICER OF HEALTH,
MEREDITH YOUNG, M.D., D.P.H.

Health Department,

Municipal Offices,

Earle Street,

Crewe,

Feb. 24th 1899

The Librarian

British Medical Association

428 Strand

London W.C.

Dear Sir, I shall be glad to forward
you copy of my annual report in the
course of a few weeks.

Yours faithfully,
Meredith Young.

